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20TH ANNIVERSARY

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MAKING MUSIC WITH TECHNOLOGY

DECEMBER 1995

1996

HARDWARE BUYER'S GUIDE

$25,000 BAG END/KEYBOARD 20TH ANNIVERSARY GIVEAWAY

AN EXCLUSIVE INTERVIEW WITH TRENT REZNOR

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VOL. 21
NO. 12 (ISSUE #236)
DECEMBER 1995

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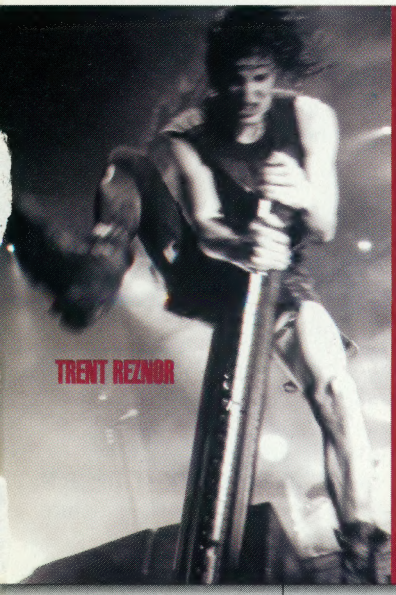

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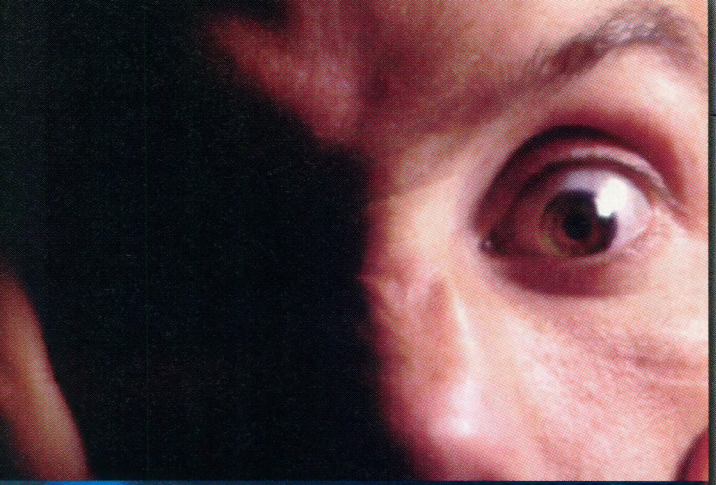

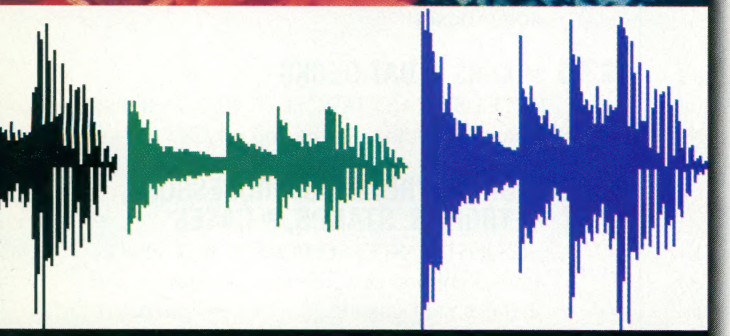

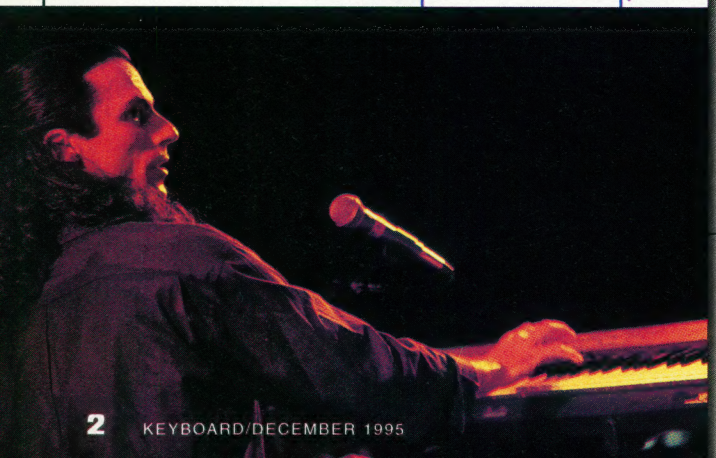

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We couldn't have said it better ourselves.

"*Out of this world, exceptionally realistic, unbelievable bass end,* and *dirt when needed*, are just some of the tired expressions that could be dragged from the cliche cupboard, because this is one mother of a synth...If you want classic analog sounds then forget the secondhand pages and buy a Prophecy, and if you want to explore virtual modeling then this is the cheapest way so far. The Prophecy will be a classic in the way of the DX7, D50 and M1." – **Future Music**

"The Prophecy is a monophonic solo instrument with a projected price that puts it into the *I gotta get one* bracket. If I hadn't been told this was a digital machine, I would have accepted the analog sounds without question. I don't think I need to be a prophet to predict that the Prophecy is going to be in demand." – **Sound on Sound**

"Love at first sight. This is a synth for the future which incorporates all the best of synths past. If you like to twist, change and control sounds as you play; if you like analog; if you like realistic emulations of brass and wind; in fact if you're interested in synthesis at all, you really have to try the Korg *Prophecy*. In my humble opinion, it's the best keyboard currently available in this price range – or anywhere near it." – **Making Music**

"Divine Prophecy. If you're looking for a synthesizer that doesn't only play, but that also shapes sound, check out Korg's latest synth called the Prophecy Solo Synthesizer." – **EQ**

"Keyboard mavens will probably love this, Korg has a hot new synthesizer...Rick Wakeman's a fan: *Occasionally, and I mean occasionally, something really innovative and exciting to play appears. Prophecy comes under that rare heading.*" – **Music Monthly**

"This is an instrument that reassures sonic originality, creativity and spontaneity at a time when recreative preset-itis has become the norm. Quite simply, this is a stunning synth." – **Keyboard Review**

"This little board packs a serious punch. I really liked how the data ribbon is built onto the pitch wheel...it provides a new outlet for expression" – **Memphis Musician**

"The Korg *Prophecy*, a 37-key synthesizer featuring Korg's DSP-based Multi-Oscillator Synthesis System, has gotten a big thumbs-up from Rick Wakeman. If you heard its wailing analog-like tones at NAMM, you'd know why." – **Musician Magazine**

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CIRCLE READER SERVICE # 102

directions

DOMINIC MILANO

Ominous Developments

If you've been following the ominous developments in these pages, you are aware of these facts: We spent the last 20 years developing the inevitable traditions — practical how-to columns, step-by-step applications clinics and hot tips features, hard-hitting Keyboard Reports and gadget shootouts, insightful Private Lessons, April Fool's gags in "April" issues that go on sale in February, the much reviled/revered Creative Options . . . December Buyer's Guides; we spent the last 11 months celebrating those traditions by running clever stories on all things real, imagined, acoustic, sampled, or synthesized that we could put in groups of 20. We also looked back on influential music and musicians in a cool series lamely titled "12 Who Count." This is the 12th and final installment of our 20th Anniversary celebration and the last chance to deliver on my promise to reveal embarrassing things about the *Keyboard* Chain Gang.

Before we descend to the depths of juicy gossip and sophomoric snickering, let's crank up the wayback machine and visit Chicago's MacCormick Place, June 1975. The occasion: the National Association of Music Merchants convention, host event for a plethora of historic firsts in the land of electronic music. The unveiling of the first commercially "affordable" synthesizers capable of producing more than one note simultaneously — the Oberheim Four-Voice, Moog Music's Polymoog, and ARP's polyphonic pretender, "the Polyphonic Ensemble," a String Ensemble fed via "an innovation called Systems Interfacing" into an Axxe's filter. The release of the first digital sequencer: The Oberheim DS-2 was capable of recording a whopping 72 notes, pitch-bends and modulation gestures need not apply. Roger Powell was demoing for Moog, I believe, and had a cardboard mockup of what would become his Probe portable keyboard controller. If memory serves (and mine's often faulty), it was this same NAMM show that saw the first ever digitally programmable synth — the EML Syn-Key, which used punch cards to store parameter settings.

Ex-Moog super salesman Dave Van Koevering debuted the Vako Orchestron, his Optigon-on-steriods answer to the Mellotron (the custom triple-manual version built for Patrick Moraz caught everyone's eye). Emmett Chapman introduced his Electric Stick to the world in the Alembic Guitar booth, and an aisle or two away a couple of guys from the Chicago Musical College of Roosevelt University, one a teacher, the other his student, tried to gather their wits and convince the manufacturers of such things as the Hohner Clavinet, the Mu-Tron Bi-Phase, Yamaha pianos and YC-45D organs, the Fender Rhodes, Iorio accordions, and Octave/Plateau CAT synthesizers, not to mention Moog, ARP, Oberheim, and anyone else who'd listen, that *Contemporary Keyboard* was going to be a really cool magazine. Really. Trust us. Advertise in it. Please. Pretty please. Okay, buy an ad or we'll shoot this dog. . . .

Keith Emerson, Wendy Carlos, Chick Corea, Herbie Hancock, Rick Wakeman, George Duke, Jan Hammer, Josef Zawinul, Stevie Wonder . . . players we idolized. We studied their licks and longed to know how they got their *sound*. The notes we knew would come with years of practice, but the sound could only come from custom modular synths, tweaked-out Rhodes actions, little black ring modulator (whatever that meant) boxes, megabucks Mellotrons, things only the rich and famous could afford to surround themselves with.

Pzzft. Set the wayback machine to the present. *Contemporary Keyboard* evolved into *Keyboard* — a pretty cool mag read by more people than any other mag of its kind in the world. *Keyboard* is sold in more than 70 countries, translated into six languages, and we didn't have to shoot any dogs.

We now play in a world where the technological playing field is level. These days, anyone with a couple hundred dollars can get their hands on a professional-sounding instrument. Add a personal computer to the setup and you've got access to multitrack MIDI sequencing and digital recording that offer capabilities undreamed of in the mid-'70s. If you need convincing, just glance through the pages that follow in this issue. Once you do that, I'm afraid you'll be left with the notion that all we care about is gear, gadgets, and more gear.

That couldn't be further from the truth. Gadgets are simply the means to an end. That end for us is music. We'll remain committed to helping you make better music, with and without technology (like, you could hum), for the next 20 years and beyond.

Now, about those embarrassing things . . . ah, forget it. There'll be plenty of time for those during the next 20 years. But tell you what, next time you run into consulting technical editor Michael Marans, hum a few bars of "Satin Doll." The reaction will be well worth the effort.

It's been a great 20 years. Thanks to all of you for being there with us. ■

KEYBOARD

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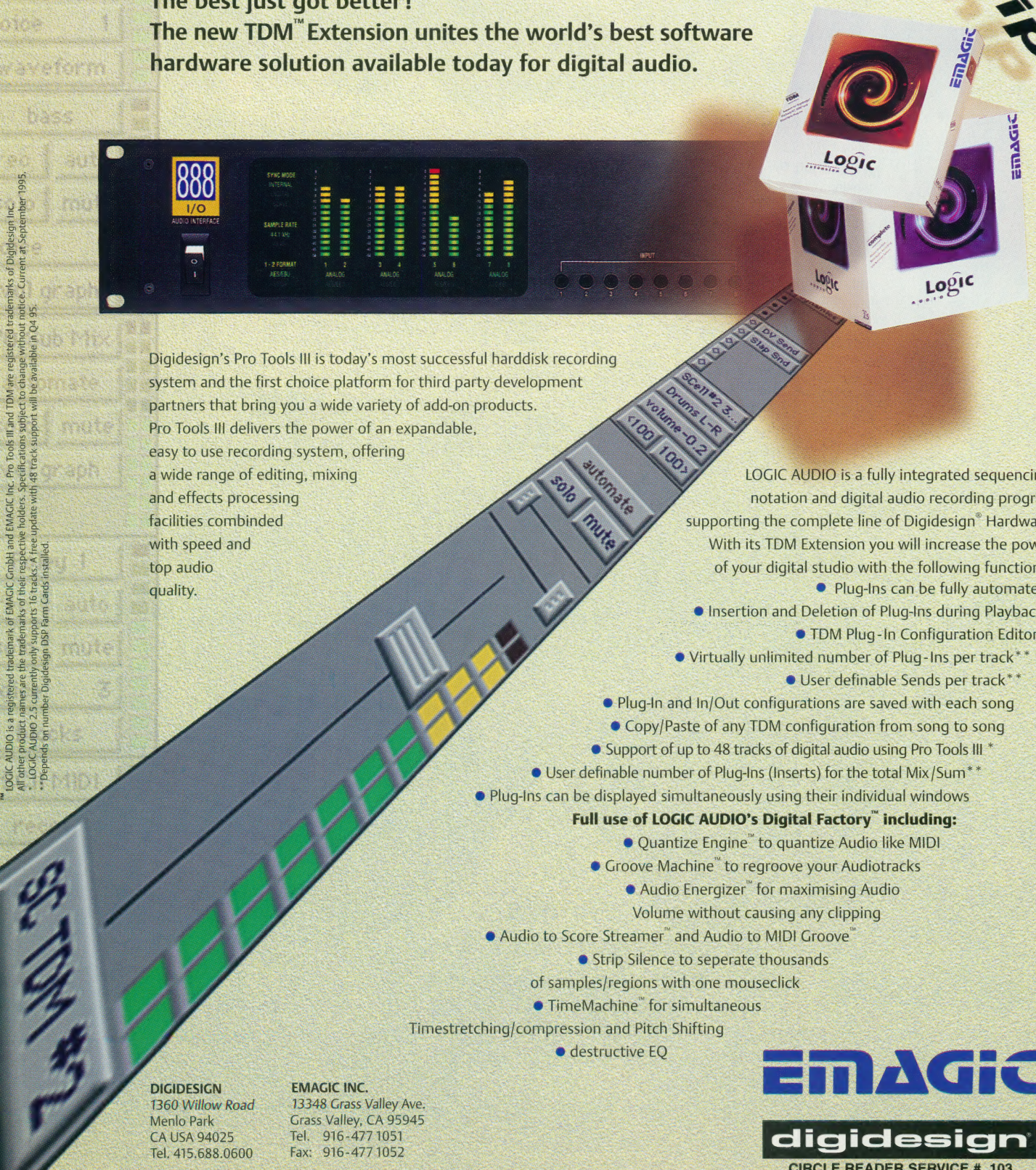

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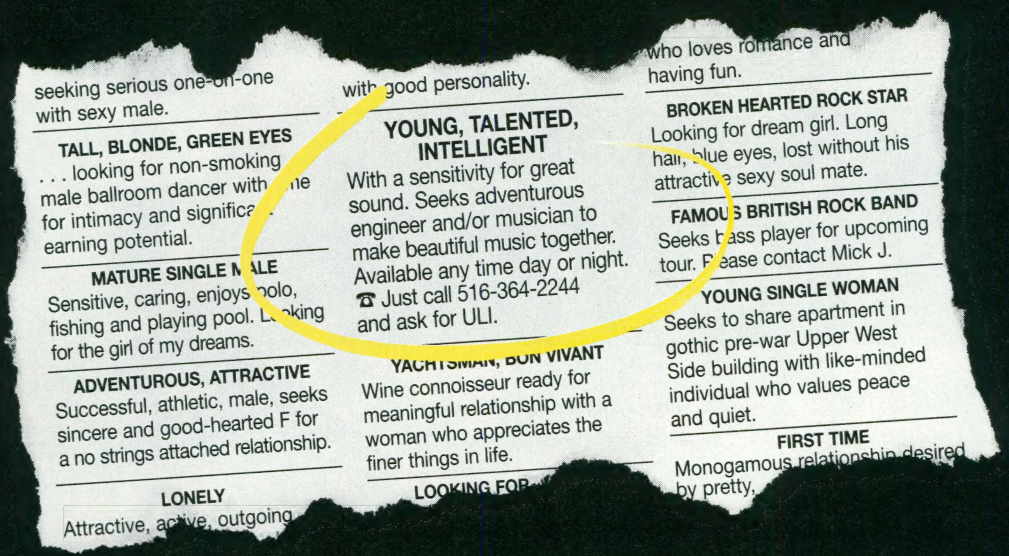

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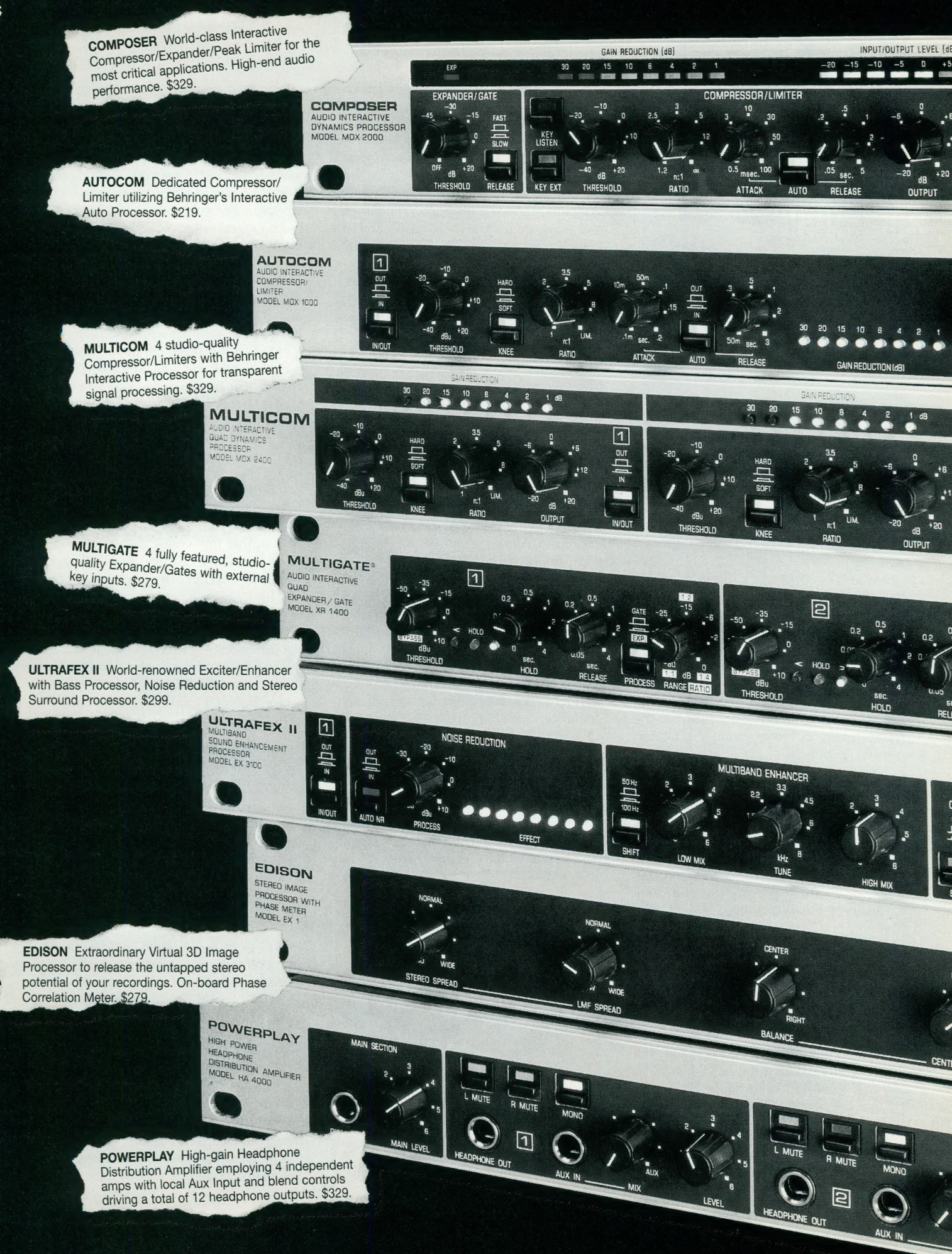

letters

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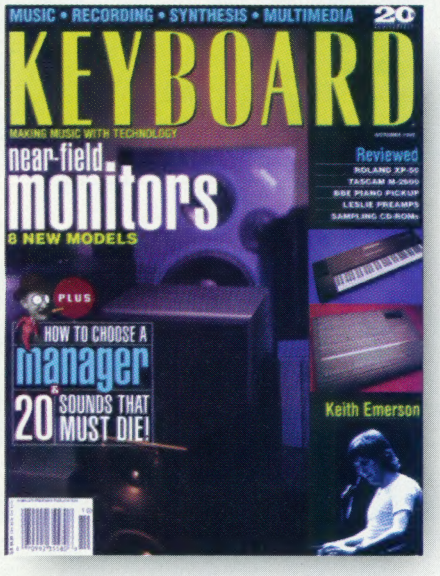

Rattle Our Cage

[*As Dominic promised last month, here is freelance writer Mark Dery's frank assessment of how we're doing. Mark's byline used to appear regularly in* Keyboard*; in addition to feature articles, between Feb. '88 and Jan. '93 he wrote a column on alternative music called Notes From The Underground.*]

Bob Doerschuk's departure is *Keyboard's* death rattle.

What was once a lively, engaging magazine, characterized by a broadness of mind and a generosity of spirit which accommodated not only mainstream artists but the home tapers in Notes From The Underground, prophets of black rage such as Public Enemy, jazz iconoclasts such as Sun Ra, free spirits such as Harry Partch, and even hip-hop turntable players, is now utterly moribund. Historical overviews such as *Keyboard's* brilliant January '87 issue on experimental music or its November '88 cover story on rap are a thing of the past, and coverage of anything outside the corporate mainstream has shriveled to World View blurbs or thumbnail record reviews — with the notable exception of the prog rock and technopop synthesists lovingly restored, through the embalmer's art, to near lifelikeness in seemingly every issue.

Given the conspicuous absence of Keith Emerson, Rick Wakeman, and other *Keyboard* staples from the culture at large, the only explanation for this morbid obsession is that the magazine, mindful of its demographic, has consecrated itself to the hallowed task of ancestor worship. That's harmless enough, though the smell of formaldehyde is oppressive and the periodic hand-wringing about "rosier times long ago," to quote Doerschuk's October '95 elegy — er, eulogy — for Emerson, is depressive. Ironically, in this and other lugubrious asides, *Keyboard* reveals its profoundly *anti*-progressive sensibility, misty-eyed with nostalgia and blind to the vital, innovative music all around it (gangsta rap, jungle, postmodern avant-garde, and ambient techno or "chill out" music are just a few examples).

But *Keyboard's* editorial myopia has a higher cost than cultural irrelevancy. By largely restricting its coverage to the where-are-they-now set — hilariously typed, by Tom Silverman in the November '88 rap story, as "a white guy [in] a lab coat" whose "contributions were made more than a decade ago" — the magazine is forced to rely disproportionately on advertising revenue. In such a context, there is a self-evident *quid promo quo* between the equipment manufacturers whose ad dollars are *Keyboard's* lifeblood and the magazine's tacit assumption that an arsenal of expensive, soon-to-be-obsolescent machines is a prerequisite for making music. Again, Silverman hit the target with deadeye accuracy: "*Keyboard* . . . prefers people . . . who stand behind giant synthesizer racks because it has to sell ad space to synthesizer manufacturers." The conflict of interest between critical journalism and the exigencies of the marketplace is glaringly apparent here, as is the elitism implicit in the notion that music cannot be made without a constantly upgraded array of high-priced gear — a notion which accounts, incidentally, for *Keyboard's* desultory coverage of artists who do not require, or cannot afford, the latest in digital technology.

On a somewhat more trivial but no less irksome note, *Keyboard's* editorial sclerosis is amply evidenced in natterings about coffee klatches and deadline crunches at "*Keyboard* Central" — anecdotes whose unabashed self-absorption would render them unthinkable in most major magazines. It is manifest, too, in columnists who are allowed to maunder endlessly about faded glories or plug their latest releases (Dave Stewart, in particular, cries out for the editorial buzzsaw) and in the magazine's highly unprofessional practice of allowing Jim Aikin to deliver a finger-wagging sermon, at seemingly endless length, to any reader who has the temerity to cross him. Stacking the deck by allowing the writer the last word is considered bad form in most magazines.

Despite this death certificate, the extraordinary makeover of *Keyboard's* close cousin, *Guitar Player*, by Joe Gore, Lonni Gause, James Rotondi, and the always inspired Rich Leeds offers hope that *Keyboard* may rise from the dead. *GP* makes the necessary obeisances to its advertisers, but somehow manages to strike a balance between equipment coverage and passionately opinionated reviews, Jas Obrecht's invaluable roots music time capsules, and irreverent, informative interviews with a stunningly panoramic range of artists. And while there's no dearth of gadget pornography in *GP*, Gore and his fellow editors have never lost sight of the magazine's reason for being: making music, not "making music with technology."

There's nothing wrong with *Keyboard* that a little soul-searching — and a good Stalinist purge — wouldn't cure.

In hope of a glorious resurrection,

Mark Dery
via the WELL

Synthesizers in the Smog

Congratulations to RLD on his new job. I've been a reader of *Keyboard* since 1977, and I have great respect for his musical and journalistic talents, but do me this one favor: Make sure his replacement not only uses synthesizers and sequencers, but actually likes them! (It will make it a little easier to take the record reviews seriously.) And you might mention to this new person, when doing an interview in Los Angeles, not to milk the smog remarks. (RLD did in virtually every interview he did in L.A. — *yawn.*)

Helen Wheels
Santa Fe, NM

But Our Drawbars Go to 9

Kudos on your very thorough and fair B-3 wannabe roundup [Sept. '95]. However, I feel the need to point out one inaccuracy in your article. You said, "Overall, the [Hammond Suzuki] XB-2 Version 2 accumulated the most points from our guest organists." Yet when I added up the points, it was the

Continued on page 53 ►

new plans from ENSONIQ

now under construction: the 1682-fx mixer

Construction crews have broken ground for the newest addition to ENSONIQ's MIDI city: the 1682-fx mixing board. Plans call for an 8-bus board, with built-in effects from our DP Series processors, open to the public in January, 1996. *(It's just around the corner!)*

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SOS REVIEW

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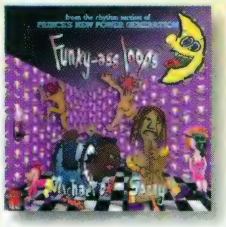

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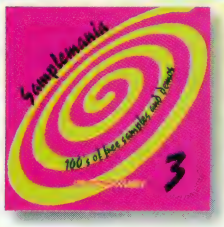

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FOR ALL SAMPLERS!!

PHAT & PHUNKY

NEW from Rich Mendelson, the programmer of the five star rated sample CD Dance/Industrial 2 - Phat & Phunky includes over 2 hours of complete loops, the samples for each loop, and a disk containing all the sequence data for every loop!! on 2-CDs. The material is R&B/Hip-Hop/Slo Jamz - perfect for any type of track.

NEW!

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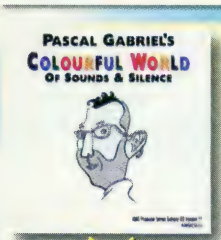

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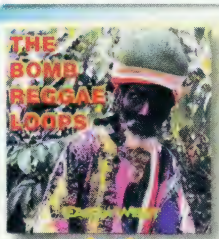

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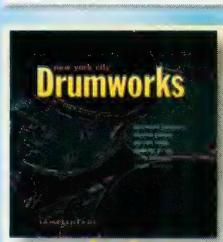
NEW!



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KEYS REVIEW

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KEYBOARD REVIEW

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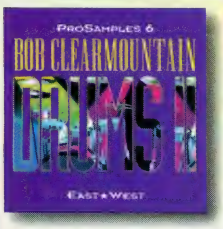

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KEYBOARD REVIEW

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KEYBOARD REVIEW

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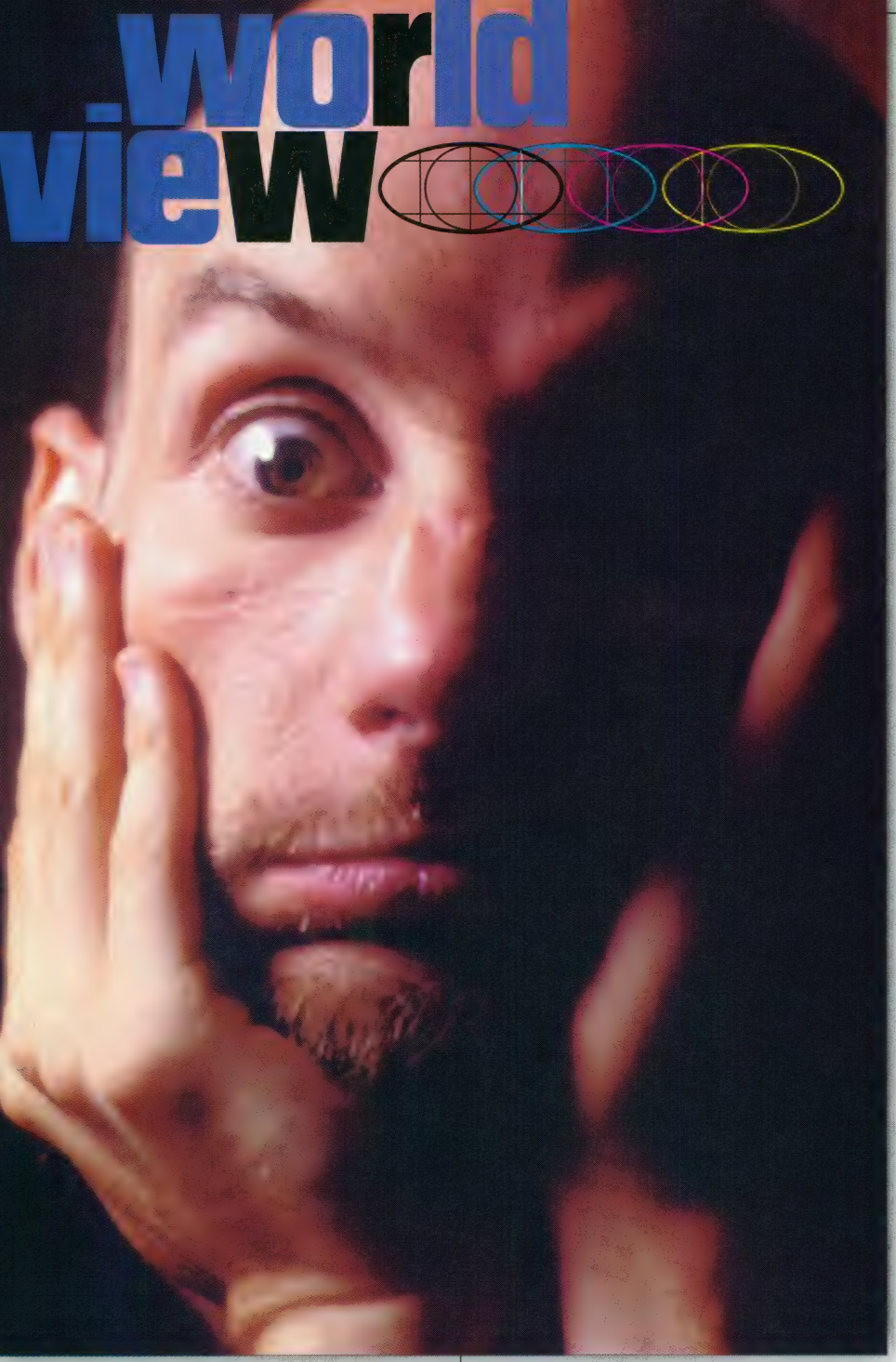


Moby

MASTER OF TECHNO(LOGY)

ASSEMBLED BY GREG RULE

With the early 1995 release of his first Electra album *Everything Is Wrong*, Richard Melville Hall, known since birth as Moby, became techno's first major star. The music press, long fascinated by the exotic underground techno scene with its ominous pulsating soundtrack and mythic faceless DJs, fell over each other in their rush to Moby's door. Sure, *Everything Is Wrong* is a lush, complex album far more interesting than the patchy compilations and occasional brilliant singles which comprise the bulk of the techno canon, but much more significant was the fact that Moby, unlike other elusive techno producers, did not shy from the spotlight.

A DJ/producer with immaculate underground credentials (his early singles "Go" and "I Feel It" were confirmed dance floor classics long before his current fame) with a self-confessed urge to be on MTV, Moby made the ideal techno pin-up. A profile in May's *Rolling Stone* was accompanied by photographs of Moby naked, but for a strip of muslin, trussed and crucified, crowned with thorns. *LA Weekly*'s laudatory piece ran under the headline "Jesus Christ Superstar." Numerous interviews emphasized his love of Christ, his veganism, his apocalyptic social philosophy (laid out in two well-written essays accompanying the CD). Techno had found its messiah and its spokesmodel.

But Moby has found his acclaim a mixed blessing, feeling increasingly trapped as a symbol of a narrow genre his music struggles to outgrow. "I don't like it when I am called a techno artist, or when people say I make dance music. The one thing I am really wary of is ghettoization, trying to compartmentalize music. On the last album there is techno and classical music, punk rock and ballads, and weird funky stuff." In fact, the prince of techno is bored with techno, preferring Nirvana or Smashing Pumpkins over anything coming out of the hard-core techno crucible. In his latest recordings, and live performances like this year's headlining slot at Lollapalooza, Moby has been cutting the brittle mechanical soundscapes of his techno with the raw immediacy of punk and the democratic abandon of live rock and roll.

Like many suburban teens, Moby was drawn to the anarchic energy of punk. He acquired a rudimentary home studio — a Roland TR-606, a Casio CZ-101, and a TASCAM PortaStudio — and began recording demos. In the early '80s he dropped out of the University of Connecticut and turned to DJing to earn a living. "The NY clubs were very eclectic," he narrates, sunken in an armchair in a basement dressing room at San Francisco's Warfield, where he was performing at the recent ENIT festival. "You could hear hip-hop and disco, punk and avant-garde rock, I played all of that." And then came house music. "House music was like a synthesis of everything I liked. It had a moodiness and a rhythmic quality to it but it also had a coldness." He invested in more equipment, including an Alesis MMT8 sequencer with which he organized his early house excursions. In techno, Moby found a genre whose severity lent itself paradoxically to emotional expressiveness. "What I like is the juxtaposition between warmth and cold. The syrupy and overtly passionate turns me off," he states with a thoughtfulness that belies his skate-punk appearance. "Eric Satie, I would say, is cold music but there is a warmth there, an emotional restraint." It is this kind of apparent paradox that marks Moby's career; he is a raver who neither drinks nor takes drugs, a techno guy who plays live with a punk band, who infuses the coldest form of popular music with an ethereal humanity. "Electronic music is really fascinating and so is human music, it is really interesting

PHOTOGRAPHY: **MARCUS HANSCHEN**

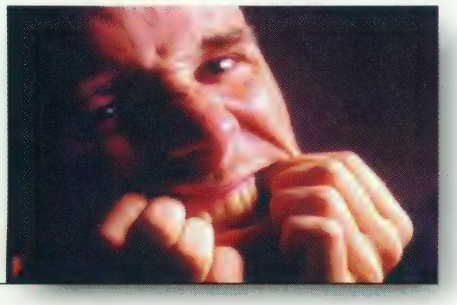
when they are combined. What I love is hybridization, I have no time for purists."

Although he now uses Steinberg Cubase and a wide range of state-of-the-art and vintage equipment, Moby's compositional method has remained the same kind of inspired cut-and-pasting he has always used. "I've never really progressed from that original studio, I have much more equipment now, but I take the same approach." Holed up in his home studio, he plays all the instruments himself, layering rocking guitar lines over breathy synths, live drums over programmed beats, samples and effects over raw conga rhythms. "I don't even think in terms of does it sound electric or does it sound organic. I think in terms of is what's coming out of my speakers interesting to me and when someone hears it will they have some kind of interesting subjective response."

When playing live Moby triggers his samplers from Cubase, and a live drummer, bassist, and guitarist (Moby himself) play over the top of the sequences. "The computer is our conductor, but sometimes we just switch it off and jam live."

For any recording artist to achieve longevity, especially in the rapidly mutating pop/dance field, they must often outlast the genre that made them famous. As house music continues its fractal disintegration — into jungle, ambient, trip-hop, trance — Moby has chosen to distance himself from the narrow "techno" tag and carve himself his own niche on the frontiers of pop.

—Caspar Melville



Jonathan Cain

THE JOURNEYMAN'S RETURN

If the 1980s were Jonathan Cain's years to roam (he globetrotted with Journey during much of the decade), then the '90s have been his time to drop anchor and work at home. If you could see his digs, you'd understand why. Cain's hilltop studio is a dream. Cherry red grand piano, racks of outboard gear, synths galore, a killer console transplanted from the Record Plant, and a magnificent view — his cutting room beats many commercial facilities.

No surprise, the keyboardist has been cranking out songs right and left from his Northern California space. In 1994 he released *Back to the Innocence* (Intersound), a rootsy, pop-based collection that spotlighted his vocal and songwriting chops. Then came a collaboration with former Journey mate Neil Schon on the guitarist's Higher Octave jazz release. Now there's *Piano with a View*, Cain's foray into the instrumental piano jazz waters (also on Higher Octave).

"I burned out on the whole synth-pop thing," he says, reflecting back on the end of the '80s. "I wanted to get back to my roots. So I kind of detoxed for a while and jumped back into the piano. That's what I consider to be *me*." Cain also took the opportunity to upgrade his home studio. "I built the new studio and decided I was going to go with my own songs . . . and the songs started coming." Everything he wrote, though, was intended not for publishing houses but for himself. "I gave up trying to sell my songs because, for one, I had the good fortune that the Journey catalog was doing well, and that gave me an income."

Trying to get work in Los Angeles wasn't as easy for Cain. "I couldn't get arrested down there," he says. "They'd say, 'We think it's nice you're trying to work here, but Journey and Bad English are mainstream '80s bands. You're kind of labeled a corporate rock guy.' I couldn't even get into production situations because everyone was scrambling for work. It was a curse, but it also turned out to be a blessing." In other words, it was the fuel that sparked Cain to write and record his own albums.

"People were always asking me, 'When are you gonna do a solo album?' So it was, 'You want a solo album? Okay, here it comes.'" And with master tape in hand, Cain started shopping for a record deal. "I did a showcase in L.A., like everybody does, and they all passed. 'We like the songs, but he's too old.' It was 'Whoa! Another rejection.' And then my manager left." Fortunately, Cain's lawyer didn't give up on him, and eventually landed the keyboardist a deal in Sweden with Empire Records, from which an international solo career blossomed. Times have changed — Cain's audience is a fraction of what it once was in the Journey glory days — but his records are getting solid airplay in their intended markets, which suits this songwriter just fine.

So what question does Cain gets asked most often by the media? That's an easy one: Will Journey reunite? "For the first time, we're *all* talking," he tells us, smiling. Stay tuned.

—Greg Rule

World View News

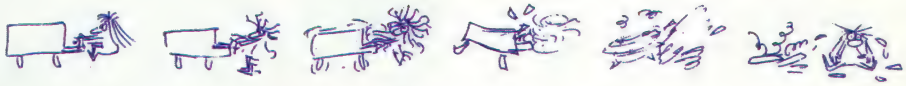
CAREER UPDATE

ON DISC. Just out on East West is *Life*, the latest from platinum hitmakers **Simply Red**. Singer **Mick Hucknall** teamed with keyboardist **Fritz McIntyre** and producer **Stewart Levine**, among others, for the release. . . . **George Duke** produced *Songs in the Key of Life* (EMI), no, not for **Stevie Wonder** but for saxman **Najee**. . . . *Moving On* is singer/pianist **Oleta Adams**'s new arrival on Mercury Records. Oleta, as some of you may recall, got her first major break when **Tears For Fears** frontman **Roland Orzabal** spotted her lounge act in a Kansas City hotel. . . . **P.M. Dawn** is back in the bins with *Jesus Wept*, their third on Island Records. "All of these are gospel songs," says **Prince Be**. "We didn't want to write love ballads. We wanted everything to have a spiritual aspect to it, even if there were images of love, sex, reality, and depression." . . . **Dixie Dregs** keyboardist **T Lavitz** recently signed a management deal with Midnight Music, and is reportedly working on a new solo album for Wild Cat Records. . . . The new release from **Machines of Loving Grace** is *Gilt* [*sic*] on Atlantic. According to keyboardist **Mike Fisher**, "We dragged out a Marshall stack, ran a quarter mile of extension cord up into the Malibu Hills, and stood on the edge of a cliff." Talk about creative tracking. Visit their Web site for a sneak preview at http://www.emerald-net/mlg/. . . . Of particular interest to **John Coltrane** fans is the mother of all box sets from Rhino Records. *The Complete Atlantic Recordings of John Coltrane — Limited-Edition Vinyl Box Set* contains 12 righteous LPs, a 36-page booklet, and a 75-minute collection of outtakes from the legendary *Giant Steps* sessions. A CD set will be printed as well. Also out on Rhino is *Just What I Needed: The Cars Anthology* featuring, you guessed it, the synthwork of **Greg Hawkes**. The package includes a 52-page booklet and 40 tracks on two CDs, mostly of the greatest hits variety, but with eight previously unreleased songs as a bonus. . . . The **McCoy Tyner** Trio has released *Infinity* on Impulse Records. Joining the trio on the disc is saxman **Michael Brecker**. . . . Celebrated vocalist **Kathleen Battle**'s latest is *So Many Stars* on Sony. An all-star lineup, including pianist **Cyrus Chestnut**, graces the disc. . . . **Edward Simon**, a Venezuela-born pianist, is importing his music to the States via Kokopelli Records (Box 8200, Santa Fe, NM 87504). "If you can imagine somebody who grew up in the salsa mentality who

JONATHAN CAIN PHOTOGRAPH: **CARL STUDNA**

THE UNINHIBITED PIANO OF

Mario Grigorov



Even while watching from the front row, it's hard to banish the suspicion that there must be someone else sitting behind Mario Grigorov on the piano bench as he plays, just out of sight. A utility player or co-soloist, perhaps. Someone to keep those relentlessly energetic odd-meter ostinatos on the money while Grigorov improvises polyrhythms on top. Maybe an assistant to nail the bass octaves as his strides become long jumps covering the entire width of the instrument. But when he takes his bow, there is no doubt about his resources: just his own two hands.

By no means is Grigorov's prodigious technique his only talent; it's just impossible not to be struck by it. His abilities are the result of having devoted his formative years to serious classical study, supported by parents who are also professional musicians. His studies proceeded apace, no matter where his father's orchestral work took them, from his native Bulgaria to Iran, the former East Germany, Austria, and the country he last called home before his move to the States, Australia.

"I used to be criticized for playing too many notes," admits Grigorov. "But now that's *me*. It's the result of what's been given to me, and it's given me the maturity and responsibility to not abuse my technique, but to use it. If a piece doesn't need it, it doesn't need it."

Grigorov attributes most of his remarkable hand independence to his study of Chopin, Rachmaninov, Czerny, and percussion. He studied orchestral percussion during his conservatory years, and a new world of drumming opened up to him when he worked with rock bands such as Split Enz. "I was playing keys with those bands, and the percussionists would teach me things. But boogie-woogie is the best medicine for the left hand," he emphasizes. Even away from the piano, his hands continue to collaborate: He sketches with both hands simultaneously, working symmetrically or independently on a single drawing. (He executed the accompanying self-portraits with a single hand, however.)

Besides his affection for odd meters, there are abrupt modulations, chromatic detours, and dance-like rhythms in Grigorov's compositions that would be easy to attribute to an Eastern European upbringing. He grins and dismisses this notion as "marketing crap," but acknowledges the importance of rhythm in his approach.

Similarly, he distances himself from the moniker of jazz pianist, even though a sizable portion of his set is devoted to highly stylized renditions of standards such as "Body and Soul" and "'Round Midnight," and he has accompanied such jazz giants as Joshua Redman and Wynton Marsalis. "Swing just isn't my natural conception," he explains. "It's so closely linked to the jazz tradition, and I know better than to try to emulate that style. I've played a lot of bebop, but that's not where I want to head."

Jazz or not, improvisation is integral to Grigorov's performances, and he loves to take jazz tunes and apply his ostinato technique to them. "It's much harder to improvise with classical music," he notes. "There's so much in it that there isn't any space to fiddle with it. Jazz has a tradition of taking pieces and playing them your own way. Otherwise, there's no progress in music."

He also composes pieces that are fingered symmetrically in their entirety. He came upon the idea by reversing the keyboard of his Roland JD-800. "It's funny," he reflects, "When an idea first comes to you, it seems like a joke. I find that I'm insecure, like it's a childish thing to come up with new ideas. But what you have is a fantastic new tool for writing."

Such pieces are not represented on his debut release, *Rhymes with Orange* (Reprise), but you certainly get a sense of Grigorov's pianistic universe from it. And talk about success stories. On his third day after moving to Los Angeles, producer and pianist Bob James overheard him trying out keyboards at a music store. They hit it off, Grigorov played a few more compositions for James, and a couple of days later, he found himself with a major label contract.

No surprise. Success has found the 32-year-old wherever he has lived around the world, which he explains partly as a result of his openness. "A very good jazz player once commented to me how amazed he was at how uninhibited I am with my approach to the piano and to music," he says. "I've kept that thought to remind myself that I always want to open myself to being uninhibited." *—Ernie Rideout*

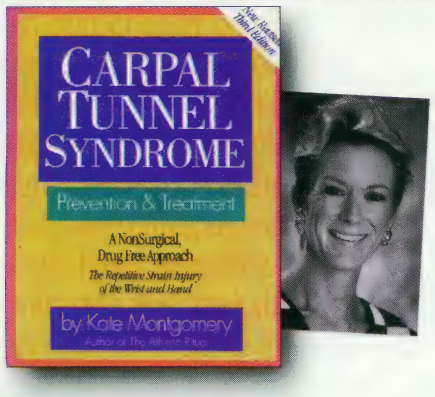
SWEET DREAMS

JIM WILSON (A.K.A., THE LITTLE WOLF BAND) BLENDS HIS CHOCTAW AMERICAN INDIAN HERITAGE WITH AN AFFINITY FOR THINGS HIGH-TECH ON *DREAM SONG* (TRILOKA). ACCORDING TO HIS PRESS RELEASE, THE RECORD IS A "SPIRITUAL JOURNEY WITH MODERN INTERPRETATIONS OF TRADITIONAL SONG IDEAS." "I HAD A SERIES OF DREAMS AND VISIONS ABOUT THE SONGS," WILSON TELLS US. "THE IDEA WAS TO DO A CONCEPTUAL ALBUM ABOUT NATIVE AMERICAN SUBJECTS." TO REALIZE THAT VISION, HE SAMPLED AND MANIPULATED SUCH SOUNDS AS CRICKETS, HOWLING WOLVES, AND THE FLAPPING OF BIRDS' WINGS, AND WOVE THEM INTO BEDS OF SYNTH LAYERS, PERCUSSION RHYTHMS, AND VOCAL CHANTS. PRIOR TO *DREAM SONG*, WILSON COLLABORATED WITH ROBBIE ROBERTSON ON THE SOUNDTRACK FOR THE MINI-SERIES *THE NATIVE AMERICANS*.

—GREG RULE

CARTOON: **MARIO GRIGOROV**

KEITH'S CURE?



Much has been said about Keith Emerson's hands of late, and readers continue to write us regularly asking about his progress. It may be too early to declare victory, but Keith made an apparent stride forward after checking in with Kate Montgomery, a San Diego-based muscle therapist. "I worked on him for about two hours," she tells us, "and in that time-frame he went from a grip strength of, say, a seven to a ten in a matter of 30 seconds." What magic spell did she cast to cause such progress? The answer, according to Montgomery, is detailed in her book, *Carpal Tunnel Syndrome — Prevention and Treatment, a Non-Surgical Approach* (Sports Touch Publishing, Box 221074, San Diego, CA 92192-1074). A video from Montgomery should also be in stores by the time you read this. "What's sad about Keith's situation, and what I want to say to all musicians," she conveys, "is he didn't need the surgery. He has a lot of things that need to be dealt with, but he will be okay."

—Greg Rule

D'ANGELO

"I think a lot of the future will point to the past," so said super producer Jimmy Jam in September's *Keyboard*, and he could have been talking about D'Angelo. A 21 year old from Richmond, Virginia, with a gospel background and a hip-hop attitude, D'Angelo's debut album for EMI, *Brown Sugar*, may set a new standard for R&B production. D'Angelo, who wrote, produced and played most of the instruments on the album himself, manages to blend the spiritual fervor of classic soul (Donny Hathaway and Marvin Gaye spring immediately to mind) with the booming drum and bass of contemporary hip-hop without merely recycling standard funk riffs *à la* Doctor Dre. Eschewing the layered Yamaha synth chords and overstacked snare drums that have come to dominate recent R&B and hip-hop (thanks to endless derivations of Teddy Riley's winning formula), D'Angelo achieves maximum effect with minimal production (even calling on Tribe Called Quest's Ali Shaheed Muhammed, a master of understatement, for programming help on the title track). The timeless simplicity of D'Angelo's compositions is underscored by the pared-down production which foregrounds a selection of retro keyboards over a backdrop of warm electric basslines and punchy 808 drum loops. D'Angelo originally recorded the entire album on his four track at home and even after landing a major deal with EMI and re-recording at Battery studios in New York he was meticulous about retaining the spacious, raw feel of the original demo. A series of highly acclaimed live shows has further enhanced his position as a champion of what we might call organic soul; seated center stage at a battered Fender Rhodes, backed by a selection of session heavyweights, with not a DAT or sampler in sight, D'Angelo's live shows offer undiluted soul to an audience weaned on deafening rap PAs and ersatz lip-synced extravaganzas. With the buzz building on his current album (the "Brown Sugar" video is on heavy rotation on MTV and BET) and a production deal with East/West Atlantic to produce other acts, D'Angelo might just be *the* young man to bring the grit(s) and gravy back to '90s soul. *—Caspar Melville*

World View News

◄ has the sensitivity of pianists **Keith Jarrett** and **Bill Evans**," says **Herbie Mann**, "the result is Edward.". . . **Speakeasy**, a guitar-bass-keys-drums quartet making waves in the San Francisco bay area, have released their debut disc, *Over the Counter Culture*. Aptly described as "roots rock with brains," Speakeasy can be heard on the Web at http://www.zoic.com/speakeasy/speakeasy.html, or call their info-line at (415) 431-8725.

ONSTAGE. After a seemingly endless world tour, **Elton John** is bringing his marathon to a close with a series of fall/winter dates throughout the U.S. . . . **Derek Sherinian** and **Dream Theater** head back to Japan to promote *A Change of Season* (East West). The band has fond memories of Japan; they were near Kobe last year when the big quake hit. . . . Interscope freaks **Marilyn Manson** are currently touring the States in support of their new EP *Smells Like Children*. If you can't catch them live, be on the lookout for their video of "Dope Hat," a colorful, Willy Wonka-goes-to-hell-type experience. Is that a Theremin we're hearing on the track? . . . If you're in the New York area this winter, and in the mood for some great piano performances, add these to your datebook: **Murray Perahia** and **Ivo Pogorelich**, Dec. 10 and Jan. 28, respectively, at Avery Fisher Hall; **Garrick Ohlsson** and **Emanuel Ax**, Dec. 3 and Jan. 14, respectively, at Alice Tully Hall; and **Norman Krieger** and **Stephen Hough**, Dec. 3 and Feb. 26, respectively, at the Walter Reade Theater.

FOR THE BOOKSHELF. Trivia buffs take note: The ultimate collection of musical facts and figures, the *Guinness Encyclopedia of Popular Music*, is now available from Stockton Press (a division of Grove's Dictionaries, Inc.). The weighty six-volume set contains more than 15,000 articles covering "virtually every aspect of popular music.". . . *Gramophone* magazine is proudly trumpeting the release of *The Gramophone Jazz Good CD Guide*, a 600-page book packed with 1,600-plus record reviews, both old and new.

BULLETIN BOARD

GONE TOO SOON. Fans of **Skinny Puppy** are mourning the death of keyboardist **Dwayne**

D'ANGELO PHOTOGRAPH: **PER GUSTAFSSON**

Nick's touring rig: Hammond XB-2 atop Kurzweil PC88, K2000 at right. Rack contents include Dynacord CLS-222 Leslie simulator, Mackie 1604 mixer, JBL compressor, Furman power/light module, and MX8 MIDI mapper.

For the past three decades, Tower Of Power has been blowing their inimitable brand of Oaktown soul from pole to pole. Although members have come and gone over the years, this is one Tower that refuses to fall. See for yourself — or if you can't catch them on their current tour, grab a copy of *Souled Out*, their latest on Epic.

The '95 lineup features a core of original members (bassist Rocco Prestia and horn-playing legends Emilio Castillo and Stephen "Doc" Kupka), three mid-termers (keyboardist Nick Milo, lead saxophonist David Mann, and guitarist Carmen Grillo), and a slew of newcomers (singer Brent Carter, drummer Herman Matthews, and horn players Bill Churchville and Barry Danielian). Nick Milo, a music major from the University of Illinois, has held Tower's keyboard chair for the past seven years.

Getting the Gig. "I was out on the road with Maria Muldaur [in 1988], and I ran into the band. I'd met the horn section previously on the road opening for Huey Lewis and the News [with Bonnie Hayes], and Emilio said to me, 'What are you doing here? I've been looking for you for two weeks.' They'd been without a keyboard player for about six months. Emilio gave me a tape, I did a soundcheck, and after that they said I could play the gig that night. There were no charts, just the tape, and that's the way I like to do it 'cause there's no middle man. So I did the gig and they said, 'Come to New York for four nights at the Bottom Line.' At the end of the second night Emilio said, 'Get your passport together, we're going to Korea next week.' I've been in the band ever since."

Organ Grinder. When Milo first joined Tower, Castillo suggested he shelve the organ and concentrate on other sounds — which he did, for a while. But, well, it's hard to keep a good organ down (no pun intended). "I think Emilio was trying to develop a new sound for the band at that time, but because the organ and the feel of the B-3 is so integral to this music, I began to incorporate it more and more into my playing style. I think it became evident that the music needed it." *Souled Out*, co-produced by Jeff Lorber, is rife with Hammond (give "Taxed to the Max" a spin). And that's not the only wood-paneled oldie Milo hauled into studio: Check out his smooth Minimoog solo on "Keep Comin' Back."

Less Is More. The thought of touring with a B-3 is enough to send most crew members scrambling for the nearest chiropractor, so Milo chose to take the less obtrusive Hammond XB-2 on the road (see photo). He has a bigger keyboard setup at home, but he likes to keep things as minimal as possible when touring. "With this band, you don't need a lot of thick pads," he says. "It's important to have everything cut through, so I go for more of a percussive approach. I use a lot of Kurzweil piano samples, clavinets, and some analog-type sounds. When I first joined the band I was trying to make thicker textures, and one thing I discovered is: Keep it simple. It'll cut through better. So I pared everything down."

—Greg Rule

Body English, the essence of moving and grooving to the beat, can now be used to enhance one's music thanks to the Dimension Beam, a new infrared light beam device that allows musicians to use their arms and other body parts to generate MIDI data. It's the latest in a continuing lineup of interfaces developed by Interactive Light, a Santa Monica-based company devoted to creating interactive light controllers for games, live performance, security systems, music, and so on. The Dimension Beam radiates a tightly shaped infrared beam in which players place their body parts or objects. Depending on how the Beam is configured, it outputs a variety of MIDI information, from note numbers to continuous controllers. "The beauty of the Beam," says Vince DeFranco, inventor and product manager of the product, "is that it doesn't replace anything — it merely adds to it. Musicians who've tried it proudly brag about 'getting into their music.'"

—Louis Brill

ROAD REPORT PHOTOGRAPHS: **MARCUS HANSCHEN**

The Young Gods

DON'T NEED NO STEENKING GEETARS

The Gods, from left to right: Franz, Üse, and Alain.

Hailing from Geneva, Switzerland, and with six records to their credit, the Young Gods are known the world over as the quintessential guitarless guitar band.

Huh?

That's right. They sound as big and bad as an army of six-stringers, blasting their riffs through Marshall stacks, but there are no guitars onstage with the Young Gods. No Marshalls either. Just three guys and a sampler.

Two samplers, actually. With eyes closed, you'd swear the swarm of chugging riffs was coming from a plankman's pick, not from a keyboardist's fingers. The Young Gods are masters of deception, and proud of it.

"At first I was a guitar player," says Franz, the Gods' Trent Reznor, "but I got tired of playing and singing. I wanted to experiment more with sound. So my first approach to sampling was a practical one." With two Electro Harmonix Super Replay sampling stomp-boxes (four seconds sampling time, max), he launched what would become one of the most revered sample-based bands of the underground. "It was fun," says Franz of the early '80s live shows. "We had a Walkman, left and right out. On the left side we were loading sounds in one of the Super Replays, and with the other side we were feeding the second one. We had two keyboards, Sequential Pro Ones; they were triggering the Super Replays with CV and gate out. So between songs we had to put the Replays in record, assign which notes went in, then [*he sings: 'weeeeaaaaa'*] and you could hear it on the P.A. 'Both sounds in? Okay. One, two, three, four. . . .'"

After a dozen or so gigs with the Super Replays, the Gods upgraded. First came a Sequential Prophet 2002 sampler, then an Akai S900. Franz went hog wild with the new machines, grabbing source material ranging from Hendrix to the Stooges to Stravinsky, and at the same time started sampling himself on guitar. The Young Gods' self-titled debut disc (1987), a fusion of classical and metal, was named album of the year by *Melody Maker*. Four albums followed (*L'eau Rouge, Play Kurt Weill, TV Sky,* and *Live Sky Tour*) and now they're on the road in support of their sixth release, *Only Heaven* on Interscope, which sounds like a creepy cross between U2 and Nine Inch Nails.

"The way we worked for this LP was different than the rest," Franz tells us. "We bought some gear, like a Macintosh and [Digidesign] Pro Tools with eight tracks. We went to regular studios to record drums, guitars, and basses — just to record some very basic grooves. Then we went back home and edited those on our system. We made loops out of the drumming, loops out of our guitars, and then went back to the regular studio to make more layers of sounds, just more experimentation."

While Franz sticks to the role of singing frontman on tour, and Üse plays live drums, Alain is the man who cranks out the majority of sampled decibels onstage. Stationed behind an Akai MX-76 controller (MIDIed to a pair of Akai S3200 samplers), he triggers one-bar loops with one hand while playing the in-between nuances and solos with the other. No tapes, sequences, or clicks are used live.

When asked how Western audiences are reacting to a "guitar" band with no guitars, Alain jokes, "They don't talk to us." Franz adds, "I heard a story about this guy who really liked *TV Sky*, but he never read the credits; he didn't know it was sampling, and he really got disappointed when he saw us onstage. But I think this is stupid because music is music whether there's one guy playing guitar, two guys, or if it's played on keyboards."

—Greg Rule

World View News

Goettel. According to a newsletter from American Recordings, Goettel, 31, died of an apparent heroine overdose at his parents' home in Edmonton, Canada. Goettel and bandmate Cevin Key were working on a new Skinny Puppy record at the time of his death; it was to be their first on American Records. The music industry is also mourning the passing of **Chuck Greenberg** (leader and producer of **Shadowfax**) and audio visionary **David Harrison**. All three will be sorely missed.

COOL SCHOOL. Bass-playing legend **Jeff Berlin** has launched a new school for musicians in Clearwater, Florida. **The Players School of Music** offers both full- and part-time courses in keyboards, guitar, bass, and drums. "The keyboard program," enthuses Berlin, "is the best program available anywhere, and it's competitively priced to be accessible to almost everyone. It is flexible enough to help both the beginner or advanced player." For more information, write to the school at 2519 McMullen Booth Road, Box 510-267, Clearwater, FL 34621.

NET NEWS. Who says you need to be a big business to make big noise on the Internet? Not **Michael Whalen**, a New York-based film composer who's pedaling his wares on the Web. "I'm using this medium to tell people about me, my company, my films, and records," he says. "The Internet will be the music distributor of the future." Whalen's Web site offers biographical data, QuickTime movies that showcase his work, and downloadable audio files. Tap in at http://www.mwmusic.com. . . . If you're looking to do some online shopping, check the latest music retail arrival, **Music Boulevard**, who are hyping themselves as the "world's biggest, fastest, and best shop-at-home music store." There are over 145,000 titles to choose from, *Billboard* charts to peruse, and a daily, online music news magazine called *Music Wire*. Give 'em a hit at http://www.musicblvd.com.

NEWSLETTERS. Having a hard time finding news, tour dates, and info on your favorite artists? Two specialty newsletters worth checking out are *Music News Network*, which covers the prog rock beat, and *Synth Music Network*, which focuses on a variety of technology-based bands. Music News Network, Box 21531, Tampa, FL 33622-1531. Synth Music Network, 4533 MacArthur Blvd., Ste. 340, Newport Beach, CA 92660.

CD SALES. According to the **Recording Industry Association of America**, sales of CDs, CD singles, cassettes, cassette singles, LPs, vinyl singles, and music videos shipped to retailers this year grew 1.8 percent compared to the first six months of 1994. "In the current uncertain economic climate, [this figure] represents a healthy picture of our industry," says RIAA chairman Jay Berman.

PHOTOGRAPHY: **MARCUS HANSCHEN**

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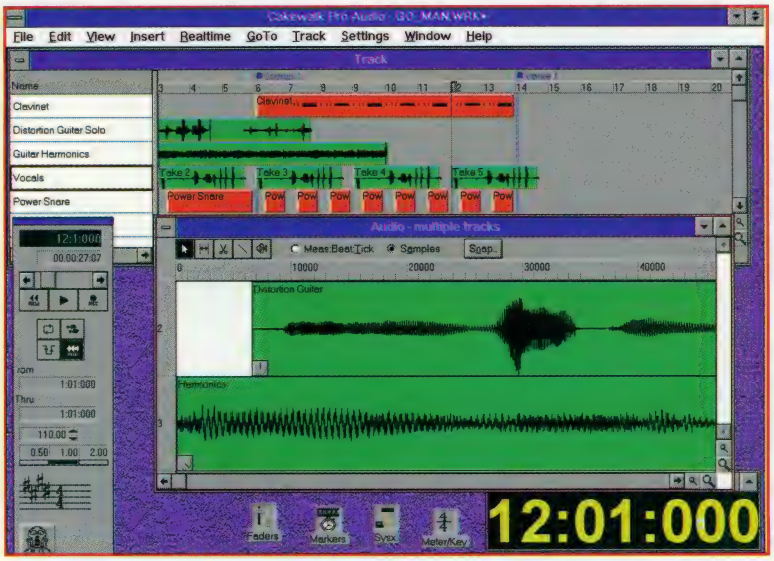

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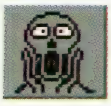

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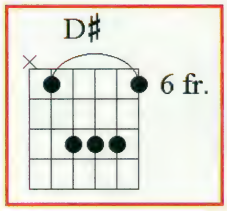

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TRENT REZNOR

EXTREMIST . . . GENIUS

BY **GREG RULE** PHOTOGRAPHY **KEVIN WESTENBERG**

His lyrics aren't exactly the stuff Hallmark cards are made of, and he might not be the type of guy Mary Ann brings home to meet Mom and Pop, but Trent Reznor — for all his darkness, for all his angst, for all his foreboding evil vibery — is arguably the most beloved and vital keyboard icon in rock music.

Let's qualify that. By "rock" we're talking the heavy side of the genre. Whatever label you choose to hang on Trent's music, be it metal, industrial, or hardcore, you must admit, the only thing predictable about Nine Inch Nails other than raw power is unpredictability. From grating, grinding power riffs ("Head Like a Hole," "Wish," "Mr. Self Destruct") to liquid synth bass grooves ("Closer") to militaristic forays into odd time signatures ("March of the Pigs"), no one does it quite like Trent.

Keyboard has profiled Trent twice in the past (Apr. '90 and Mar. '94) and both times received bundles of mail. A few readers wrote to complain about his razor-sharp tongue, but most sent letters of gratitude, citing the Nine Inch Nails mastermind as their guiding light. For that reason, along with the fact that he has almost singlehandedly saved keyboards from extinction in rock, we're pleased to include Trent Reznor as the final artist in our 20th Anniversary "12 Who Count" series. ►

TRENT REZNOR

Although Trent has declined nearly all requests for interviews of late, he graciously granted *Keyboard* a day-long hang for this special piece. When the okay came in, we caught the first flight to Hartford, Connecticut, where the Nails were just days away from kicking off a major dual tour with David Bowie (slated to feature a nightly set where Bowie teams with Trent to play Nine Inch Nails music and vice-versa). In a gutted hotel room turned makeshift production studio, Trent gave us the goods; and, unlike the man we've all become accustomed to on video and stage, he was in a kind, gentle frame of mind. He was polite, thoughtful, and no, he didn't smash or set fire to any of his gear that day. (Shucks, we were hoping to bring home half of a Nord Lead.) "Contrary to popular belief, I'm not a vampire," he told us, grinning. "My reflection *does* show up in a mirror." Don't get the wrong idea, though. Trent was still Trent; he was booked into the hotel under the pseudonym Dr. Hannibal Lector.

Trent's traveling rig is a technologist's dream — and a hotel maid's nightmare. "We don't let the maids in," joked drummer Chris Vrenna, pointing to day-old food leftovers and piles of trash as proof. Cables, racks, and instruments were strewn from end to end. Anvil cases were stacked chin-high in the bathroom. Components of the confines included a Macintosh Quadra 950 with a 10Gb drive running Opcode's Studio Vision and Digidesign's Pro Tools (eight channels), and, in alphabetical order, an Akai S1100, Clavia Nord Lead, E-mu EIV, FocusRite compressor and EQ, Korg Wavedrum, Kurzweil K2000, Mackie 32-channel 8-Bus and LM-3204 mixers, Oberheim Xpander, Peavey Spectrum Analog Filter, Roland Super Jupiter, R-70 drum machine, vintage Roland Vocoder, Sequential Prophet-VS, TASCAM DA-88, Waldorf MicroWave, Yamaha VL-1m, and Zoom 9050 effects processor.

"Because Nine Inch Nails is focused on a certain element of my head, usually the more negative region, people get the idea that that's all there is. But it's not. That's not to say I don't have a lot of problems to work out, but I don't stay in a dark room all day with a sheet over my head."

Here, then, is round three with Reznor. As before, he gave us mouthfuls of quotable material. This time, however, the focus was on the state of technology, his celebrity status, censorship, his new studio setup in New Orleans, and his future projects (including a possible venture into the music software business). As an added bonus, we've uploaded the electronic version of this interview, along with some audio clips of it, to our Web site. Tap in at http://www.keyboardmag.com/keyboard and hear the quotes directly from the horse's, er, *human's* mouth. Enjoy.

Now . . . where did we put that garlic necklace Trent gave us?

People who know you only through your records, videos, and stage appearances perceive you as a deep, dark, troubled individual. Are you really as angry as your public image suggests?

Right [*long pause*]. First of all, did I conceive Nine Inch Nails to be this monstrous, negative entity? No. It started from: What can I say, if anything? And I noodled around with some shit that didn't mean anything to me, but I liked the Clash so I tried to write lyrics like that: I don't care about politics and the world in general. And then I got to a more intimate level and I realized I had a lot of things I wanted to say. So I started to put things on paper, how I really felt, like journal-type entries, and it came out being about things that bothered me: I don't fit in, I'm not good-looking, I want this out of life and I don't think I've gotten it. Things of that nature. I'm not saying any of those feelings aren't things anybody else hasn't felt, but my way of exercising and expressing this frustration was through my music. And I realized that I had more to say in that department than anything else. It was also kind of embarrassing because it was right to the bone. It wasn't like Lenny Kravitz's lyrics, for example. Rock lyrics. Probably well-written. But with my lyrics, it isn't a character saying it, it's *me* saying it.

I've always been drawn to extremes, whether they be film or music or self-abuse or whatever it might be. I don't consciously sit down and think that much about it. Onstage, it is a conscious decision to not talk between songs. "How's everybody doing tonight?" First of all, that's not what I'd normally say. If I based my stage persona on David Lee Roth [former Van Halen frontman] I would feel a need to do that, but I don't. You do become an extended caricature of yourself on the stage because it's surreal. You're in front of all these people, and there's this energy, and you're allowed to do whatever you want. So it becomes this distortion. When I started out, I was really eager to talk to the press about anything truthful about my life and this and that, and then I thought, "I don't need to do that." That last thing . . . *Details* magazine, they hit me totally exhausted on tour and I was being an idiot. This guy picks my brain and I just dumped. I just let loose every bit of personal shit I never wanted to talk about. I don't need people to know that about me. They know enough about me through my music. So in the media I've now become this entity that some people dismiss as cartoonish or whatever. I've just put on a thick skin. It doesn't mean that much to me. If I thought I had nothing to say musically, and I needed some image to just become a character where I can schlock about, then I'd put more effort into it. I think because Nine Inch Nails is focused on a certain element of my head, usually the more negative regions, people get the idea that that's all there is. But it's not. Now, that's not to say I don't have a lot of problems to work out in my brain, but I don't stay in a dark room all day with a sheet over my head.

I go through phases. *The Downward Spiral* was bleak. I enjoyed the process of doing it, but where my head was at was pretty bad. And then the nature of being on tour, it's just exhausting. There's less time for reflection, and more time being bombarded with things to do every minute.

What are your feelings on how famous you've become?

The big thing in my personal life that's changed would be I get rec-

PHOTOGRAPH: **JONATHAN RACH**

ognized now, and I never did before. I've thought about this a lot. Is it nice to have people care about your music? Yes. Is it nice to get paid for doing it? Yes. There are endless benefits, and I'm not complaining about them whatsoever. But what I personally don't long for is adulation. Nine times out of ten I'd much rather walk through the grocery store with nobody looking at me. You start feeling paranoid.

Do you have to go out incognito or with a bodyguard?

No, I'll never do that. I mean I'll wear a baseball hat because then I'm invisible for some reason, but nothing near the level of having to be protected or any of that shit. Nor would I ever want to become that. I'd just as soon be invisible. When I'm onstage, I don't demand fan worship, and I don't need it for my ego. It is super nice to have someone like David Bowie call you up and say, "I want to tour with you." Or, I got a really cool letter from Alex Lifeson [Rush guitarist] saying, "If you ever want to fuck around in the studio. . . ." That, to me, makes it worth it. Or to be able to call up somebody you admire and they know who you are, and they're willing to talk to you — that element of it I think is great. As well as, "Hey there's a new toy out that I can buy." You can get the piece of gear that you could never afford before . . . one that doesn't work yet [*laughs*].

Now that you're very successful, and you've sold millions of records, how do you respond to people who accuse you of being a sell-out?

I don't think I've compromised my music to try to cater to a huge audience. I think that we're the result of, I'd like to believe, talent, but also a degree of timing and luck, being in the right place at the right time. The Woodstock [anniversary] concert was a gamble. I've said before and I'll say it again: We did it because they were paying us a substantial amount of money that offset the cost of the tour we were on. So I figured, one show and we'll try to do the best we can. But when you see that guitar neck [logo] with the Pepsi thing sitting on the end, you think, "This could be a nightmare." But we went and it ended up being the biggest boost we could ever have. I thought we played shitty, but onstage I felt like we were connecting. I had no idea what chaos was going on in the mobile truck, but I felt like we connected, and it meant something to me. I felt real good when we left the stage. And I think also because of the amount of mediocrity around it, it stood out as something interesting. And after that, people recognize you everywhere. I would imagine a

"I listen to what's popular now in rock music, and the idea of a guitar, bass, and drum band in the Nirvana mold is just so utterly boring to me. Not that there aren't good songs that come out of that, or good bands — Nirvana being one of them — but to me, to get a band together that just, 'Okay, *G*, *D* . . .' It's been done. It's been done to death. If you're going to make music, have something to say, and have some unique way to say it."

lot of people who bought *The Downward Spiral* had no idea what was really going on there, or even liked it once they'd bought it. I would hope that it might have opened a few ears up, and if it made people think a little bit or opened their minds or at least made them angry, great. It's done more than Hootie And The Blowfish, which serves a purpose, but I'd rather challenge people to some level. And if that opens a door up for some more electronic music to not be shunned in this age of retro thinking, then I'm glad I did it.

There's a weird climate right now, because it seems like there's real confusion about the element of commerce in music — the business of it, and the art side of it. I think a lot of guys get bands together and, "What do you want to do?" "Well, we want to get signed. We want to put a record out." So, okay, they get that, they put a record out, and pretty soon they've sold records and they're famous and, "Well no, we're not a sell-out." It's a business. If you want to make music and you don't want anybody to hear it, and maintain your obscurity, don't sign a deal. Don't put a record out. Don't go into the studio. Don't waste your time and the public's. If you do, then you're acknowledging that you are in a business. You're in a business where people around you are out to make money, whether it's through you selling records, or tee-shirts with your face on it, or whatever else it is. Just acknowledge it and approach it intelligently and don't let it fuck with your art — it doesn't have to. I don't think it does.

A crop of new musicians are citing you as their mentor. How do you feel about being a father?

Well, now that I've turned 30 [*laughs*] . . . nah, I mean, it's obviously flattering. I think what Nine Inch Nails did was start from a point of reference that at one time was somewhat obscure, electronic music, and mutated into something that was similar to but different than. We had elements that the influences I was drawing from didn't have, and those elements made it more palatable. It became something that could be consumed by more people. I'd like to think I maintained integrity within that, but I by no means am standing on a soapbox saying I've created everything — that I came up with the whole concept of sequencing or distorting this or that. I know there's a degree of animosity from those super purists who say for music to be cool it can only be liked by a few certain people who are cool enough to know about it.

Last time we talked, you were just getting ready to hit the road. Here we are a year and a half later and you're still on tour. How have you and the band been holding up?

Pretty good. There was a time, right around February of this year, when it had gone on too long without a break. It got redundant playing the same set night after night, and there was a phase where I really just didn't want to tour anymore. Then they came up with, "Do you want to go to Australia for three or four shows and some festivals?" "Hmm, this might be kind of fun. We'll try it." And halfway through the first set the first night it was like being right back on that last week. It wasn't good. So I got busy setting up a studio in New Orleans, kind of getting a home base there.

A permanent installation?

Yeah. We bought a 48-track analog studio, and the concept at that early time was to get out of a real studio to do stuff in a different environment. A big lesson I learned from the Tate house experience is not to live where your studio is, because it just became an entrapment. There's a million distractions that will keep you from working — kind

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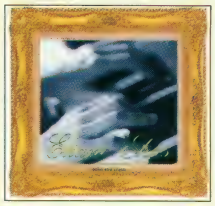

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CIRCLE READER SERVICE # 107

TRENT REZNOR

of the opposite of what I originally thought. That record [*The Downward Spiral*] probably took longer because you're working and the phone rings and it's UPS at the gate with a delivery. All those kind of things happen because it's your house. So when I decided to go live in New Orleans again, I casually looked around for a temporary space to set up shop, and we found this place. It was perfect. It was real big, cheap, and that idea mutated into a more permanent installation, maybe because there aren't any studios in New Orleans that are right for what I do. What it's going to end up being is a pretty cool SSL room, an analog 48-track place, that sounds really good. It just got functional right when we left to go on tour.

In addition to being the home of Nine Inch Nails, will it also be available for the artists on your label (Nothing Records)?

Yeah, all the bands on the label will have access to anything in it. There are a couple of rooms to work in, another room with 24 tracks of DA-88s, Pro Tools rooms, and it could be commercial if we wanted to do that. So if we go on tour again for a year or something, we may open it up to select things. But we tried to make a place that's comfortable to work in without many distractions. If people want to clear their heads, there are different places to go, there's an outside area, and inside there are rooms with different things going on in them.

Now that* The Downward Spiral *has been out for a couple of years, what do you think of it?

After we finished it, I didn't listen to it for a while. I was too close to it. Then we went on tour and started playing some of the songs from it, and about midway through that tour I started listening to it again, a lot, and I was pleasantly surprised. I thought it held up. There were some things that I'd even forgot I'd done. And about a month ago, I started listening to it again. As with everything I've ever done, there are things I wouldn't do again, but generally I'm pretty pleased with it.

What things wouldn't you do again?

[*Pause.*] When I'm working, I try to maintain a spontaneous element, and not over-analyze everything. Usually what I'll do . . . like with *Pretty Hate Machine* I knew I only had X amount of time to get that whole record done in the studio, so I had everything completely done in advance. The studio was just a formality of putting it on tape. There was very little spontaneous studio energy coming from me because I just didn't have time. One day it had to be recorded and the next day it had to be mixed, for every song. So there wasn't a lot of, "Hey let's try. . . ." The opposite danger occurs when you're under the false impression of, "Hey, we're not paying. This is a house. Let's fuck around." And you can get off track that way. We could spend a week mixing a song when it was probably good the second hour of the first day. So I try to keep an element of spontaneity going, but at the same time what I've learned to do is, do something, don't think about it, and then come back to it a couple weeks later and just listen. If you like it then, usually it's okay. So towards the last bit of that record [*The Downward Spiral*], I knew I was winding down, and I had a last little burst of energy. I did some things that didn't have that check time. One was "Big Man with a Gun" and the others were "Downward Spiral" and "Hurt." Listening to it later, there were a lot of things about "Big Man with a Gun" that I wouldn't put on there now. It fit an emotion I thought needed to be

PHOTOGRAPH: **JONATHAN RACH**

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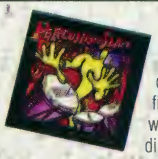

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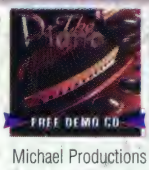

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on the record, but there was probably a better way of accomplishing it now that I've had time to look back at it. And little, dumb things about the mixes. Unlike mathematics, which is an absolute. . . . You reach the end and either it's right or wrong, and there's something about that that's beautiful. You reach the end and there's a conclusion. It's absolutely over. But if you're doing a mix or doing something creative, you don't get that "I'm done" signal. You have to learn when to say, "This is good, but could it be better?" Maybe. "Could you write a better lyric?" Maybe, maybe not. "Could you mix that better?"

Some artists put those decisions fully in the hands of an outside producer. What are your feelings about trusting outsiders?

I do to a degree. I think my collaborative efforts with Flood and Alan Moulder worked. I've learned that you need some outside objectivity at times. There's other times. . . . I mean, when I produce Marilyn Manson and Prick, I think I have that objectivity that the artist doesn't have. They're hearing that lyric being funny or they're hearing that one note out of tune and they might be missing the big picture that this is a statement.

Like on the Prick album, Kevin and I worked on four of those tracks in my bedroom when I was doing *Broken*. We sat and messed around with four tracks of Pro Tools running Studio Vision, a couple of keyboards, and a DAT machine, and it became a challenge of, "How can we arrange this music with these limitations?" It was one mic in a room, and if there were background vocals it was me yelling from the other side of the room, and mixing everything destructively — mix these down to two tracks and keep going — and we ended up with four songs. So four years later, ironically enough, signed to my label, he worked with other producers. And when we were assembling the record, just for the fuck of it I put the old mixes up and, technically, they weren't mixed good, but there was some sort of energy spark there that was way better than the other ones that took days trying to recreate the accidents that occurred there.

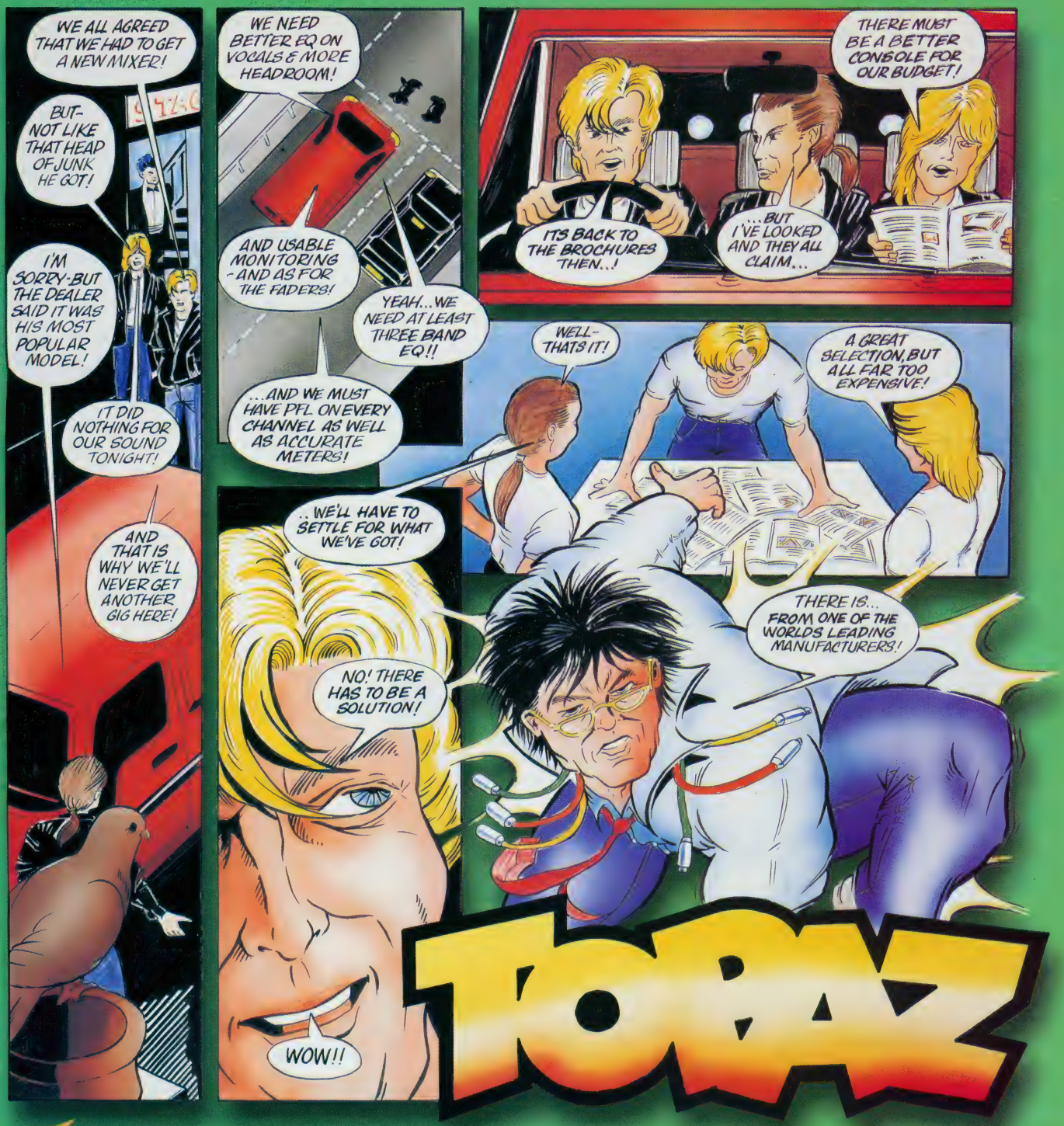
Accidents?

Studio Vision at that time couldn't play back as many cuts as I had in this one part through the [Digidesign] DAE, so it for some reason would put this thing up an octave and skip through another section, and it became a hook that if it wasn't in there the song didn't sound right. So on the album we ended up using the original mixes. I was trying to explain to Kevin when those elements of magic occur, take advantage of it. Bob Clearmountain might be pissed off when he hears that album, but nobody else cares.

Chris (Vrenna) said Bob Clearmountain was screaming for aspirin after he mixed you at Woodstock.

[*Laughs.*] That was our thing in the studio: "Would Bob Clearmountain hate it?" "Yeah." ►

CIRCLE READER SERVICE # 109



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"It's good then." [*Laughs.*]

Chris also said you were toying with the idea of possibly recording Nine Inch Nails live in the studio. What's your vision of the next NIN record?

Well, it fluctuates. I'd say it'll probably end up being a hybrid, because my latest thing I'm hot to do is collaborate with some other people. Probably at the top of my list this second is Mike Garson from Bowie's band. He's a phenomenal pianist/keyboardist. We've been messing around at the soundchecks, just playing stuff, and I don't understand how that sound's coming out of his instrument. He's coming from a place that's far removed from me, but kind of how I used Adrian Belew [guitarist] on the last record I'd love to feed him some of the things like that. I'd like to work with different groups of people for different ideas. The idea of live is intriguing because I've done every record pretty much based on the same format of programming. I like the idea of doing a record that is performed and then treated maybe in an Eno fashion. I listen to what's popular now in rock music, and the idea of a guitar, bass, and drum band in the Nirvana mold of music is just so utterly boring to me. Not that there aren't good songs that come out of that, or good bands — Nirvana being one of them — but to me, to get a band together that just, "Okay, *G, D* . . ." It's been done. It's been done to death. If you're going to make music, have something to say, and have some unique way to say it. To me, I look at the studio as a tool, an instrument. There's so much you can do sonically. To fall into that trap of, "To have it be real music it's gotta be real instruments or real people playing it" is complete nonsense. I like the challenge of doing a record, maybe Nine Inch Nails, maybe not, of it being a traditional instrumentation but seeing how far out you could get that without sounding like Nirvana.

People wonder if there might ever come a time when we'll see you on TV, smiling gleefully, singing about a mountain stream or whatever.

That's a hard one to answer, but if I felt that way, that's what my music would be like. Yeah. If I went through such a sudden change, though, I think Nine Inch Nails would gracefully bow out as an entity and I would become whatever else.

What's the story behind the name Nine Inch Nails?

It just was a name. Everyone's got their theory on that — nailing Jesus to the cross, or this and that. But it just came up. I liked it. I liked the way it looked in print, and it passed the two-week test.

How do you think Nine Inch Nails would sound unplugged?

[*Grins.*] I had a few theories on that. My favorite one was us onstage with our equipment, and I'd look at Chris and say, "Start the tape." He reaches over and pushes play, and of course it's not on, it's unplugged, you can see the plug hangin' there. And I say, "Start the tape, Chris," and he pushes the start button and, nothing. So we just smash our instruments and leave. [*Laughs.*] But I've thought about interesting ways to . . . the thought I've had is . . . I've hung with Rick Rubin [producer] a lot, who's most likely going to produce a new Nine Inch Nails album, because I think it's an anti-Flood-type mentality, which is good because I need to have a new change. And I know he's much more traditional song-oriented. So as a writer I've been thinking more in terms of seeing what it would be like to go in that direction a bit. And I don't mean becoming more conventional, but maybe starting with a song and then arranging it in any fashion. Just little games you play to trick yourself into things. At the same time, I also like the idea of removing those elements and seeing how far removed from a traditional song you can get and still have an element of something catchy about it.

Charlie (Clouser, Nine Inch Nails touring keyboardist) programmed a batch of tracks for White Zombie's latest — songs that often have only one or two chords that cycle through the whole thing.

But there are choruses hidden in there, and that's the thing. You can have one note go through the whole song, but when he [Rob Zombie, singer of White Zombie] starts singing

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"More human than human," that's the chant-along chorus. Most of Ministry's songs are one riff for as many bars as you can stand it, but it's still catchy because it does relate to something, as opposed to, say, some vintage Skinny Puppy where there is no element of . . . what you think might be a chorus never comes back, which I think can be either rambling nonsense or an interesting format. I'm into songs that are breaking out of that mold that I've fallen prey to: verse, chorus, verse, chorus, bridge, solo section, chorus, chorus. Almost every one of my songs fits that same structure. I heard a track by the band Shudder To Think and I thought, "What in the fuck? The meter's weird. Nothing repeats until the very end where there's this little chant. It's fuckin' cool shit." So I went out and got the record. The structure of that was weird, but it worked. Another thing . . . Bowie was an influence during his *Low* period. That was a big influence on *The Downward Spiral* from a point of, not only the mood and the desperation that it had, but structurally the songs are bizarre. One might not have any vocals, but you don't even realize it. You didn't even miss it. Or there's another one: verse, chorus, fade out. Just things like that where they break up that tried and true formula. Or odd tempos. I like watching people who aren't musicians trying to bob their heads to "March of the Pigs," and they can't figure out why they keep getting off.

"Closer" was a big hit despite its hook line ("I want to fuck you like an animal"). Did it bother you when you heard that song being played with the f-word bleeped out?

That song kind of came about . . . it just started with that line, and then the music built itself around that. That was the scariest song to write, because there would have been a time when I wouldn't have allowed myself to be that obvious, because I would have been afraid that it wasn't tough enough, or it was too disco. When I was writing it and I came up with that bass line, I thought, "This is so obvious, but fuck it." I mean, if you listen to the whole album, that song, musically, is the most digestible if you're trying to pick a single, but it's also crippled from the start because of the chorus. But I'm not going to change it to try to make it a single.

So do you think bleeping the f-word was the best solution?

On one hand, yes. I mean, I saw somebody's little kid singing it, a five-year-old kid. And I've got to question my own intentions in that department. But aside from that, what I've tried to do is subversively sneak some things in. I realize we have a pretty big audience now, so how can I take that position and slip some things in that are potentially dangerous ideas? Not to decay the moral fiber of America, but to have something of substance to think about other than just fluff. With all this controversy about song lyrics, I was surprised that we didn't get blasted sooner than we did. But their own idiocy and lack of knowledge crippled their argument. I would find lyrically a lot of the things on *The Downward Spiral* more dangerous than the gangster rap stuff.

But when the song started to take off, it surprised me. What I hoped would have been a higher art thing became a frat house, date-rape, strip club anthem thing. Sad. I mean, it is an ugly song, no doubt. It's not nice. It's not life-affirmative. It's probably the ugliest on the record, which is why I dressed it up in nice easy-to-listen-to music. A nice juxtaposition to the lyrics. But as culture moves on and people become less inhibited by religious oppression and are encouraged to think for themselves — if people get over the silliness and the tools and mechanisms of organized religion that are used to invoke fear — things would be a lot better. It's something like the primitive stage the Internet's at now. Just to have information available to anybody anywhere that's non-governed and non-censored. You can find things now that your library doesn't have that's current and it's on every computer. It soon will be on every TV set. It's going to open people's minds up to more things. I think censorship has been causing a lot of problems in a lot of different departments in terms of human evolution. But, hey, that's what this country is based on — the ridiculous right wing, keep you in line, don't think too hard mentality. ►

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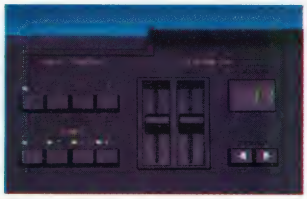
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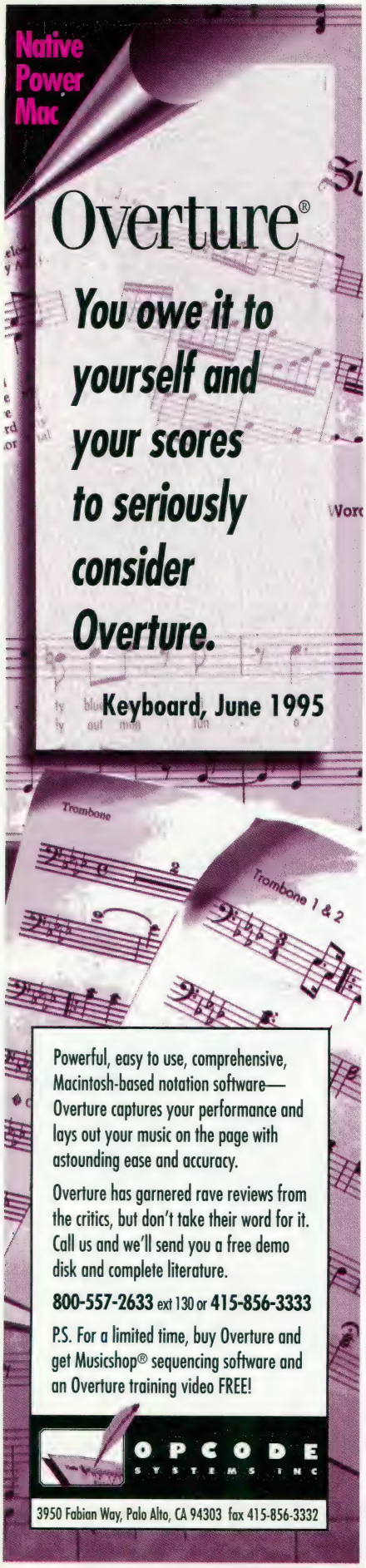

CIRCLE READER SERVICE # 115

TRENT REZNOR

Speaking of the Internet, what are your feelings about multimedia, be it CD-ROMs, enhanced CDs, Web sites, and the like — do you plan to dive in?

I've done quite a bit of thinking about that; we've had a couple of propositions from different CD-ROM-type multimedia people. So I did my degree of research of just checking out what's out there now, and I've had some conversations with Todd Rundgren, but, you know, as forward-thinking as I want to believe that I am right now, I approach that with a real degree of hesitation because I haven't seen any that I think are good yet. And I blame that on where the hardware is today. Everybody seems to bring commerce into it. To make it worth your while to produce it, it should run on a machine that's mainstream enough to warrant putting it out, which means the incredibly shitty Sega-CD systems or a PC. I don't think anybody wants to listen to music on a computer, or go through the hassle of having to have a couple thousand-dollar computer just to do what? To see a flickery, shitty-looking video along with some lyrics? I haven't been impressed with the ones I've seen, although I haven't seen the EBN [Emergency Broadcast Network] one yet. I like the idea of it, but that also brings up another element of: Do people really want to interact with music, or do they just want to listen to it? The idea of an interactive movie where you actually control some degree of what's going on, that seems a bit closer to me than, here's a CD where you can remix some of the tracks and you can do this. Todd Rundgren's is an interesting one, but I can't imagine fucking with it for more than maybe a couple of hours. With a record, I can listen to it in a car, or I can put it on and it does the work for me.

The most interesting one we had presented to us was a demo by a company in England called ESP, and it was for the Philips CD-I, which, again, is another failed platform. But you put this in, and it actually hacks into the operating system of the unit, so everytime you run it, it's different. What's really in there is several videos, and there is going to be an interactive interview with me where you could type in words, and I'd respond if it could recognize the text. And if you asked me irritating questions then I'd give shitty answers, and finally just leave. What they tried to do was put an element of chaos and personality into this disc, so maybe the joystick this time went in the opposite direction, or it would be difficult to control, or different buttons did random things. You didn't know what all was on there, so I thought it was an interesting way to add depth to something.

If it gets to the point where everybody's television set has a CD player hooked up to it, and they can put a CD in and see full-frame, full-motion video with no lag time, and good audio coming out of stereo speakers, anyone can get it, they're as common as CD players, then that will be the time to seriously consider the medium. When I pointed that out to Todd, he said, "Yeah, but someone has to be there in the interim. There are shortcomings, but someone has to do it." And I agree with that, but I have such a level of perfection to what I do that I'm not comfortable with it yet. Now, at the same time, I've always been fascinated with video games, and we are involved with the guys who made *Doom*, id Software. They're making a new one that is a *true* 3D world. Like all the other games, it's totally politically incorrect, gory and violent and scary. We met up with them, and I'm involved in the actual sounds for this environment — which is not music, it's textures and ambiences and whirling machine noises and stuff. We tried to make the most sinister, depressive, scary, frightening kind of thing. You'll be able to hook hundreds of people up together over the phone lines and see each other walking around, kill each other, *et cetera*. That's an interesting little side project that, I think, works really well with the technology that exists. It's been fun.

Are you going to launch an official Nine Inch Nails Web site?

We're working on a Web site for Nothing Records which will be primarily a database of information on all the bands, with lots of links. But there's a kid who's set one up out of Florida, and it's pretty impressive. We're just going to hire him to work for us — mutate his to be a real one. Part of the reason of commerce is that there will be merchandise available through there. That's the business reason to justify it, but my main reason is just as a source of information. Hopefully this will help us get rid of 98% percent of the false information that seems to be circulating about us.

Like whether we can see your reflection in the mirror?

[*Laughs*] For starters.

We've heard rumblings about you possibly getting involved in music software manufacturing. What's that all about?

Charlie [Clouser] and myself are talking about starting a software company to put out some very specialized DSP-type software, maybe in the form of plug-ins, but more likely mini-stand-alone applications like Sound Hack. Little things. Ways to fuck up, degrade, and mutate sounds that aren't real commercial. Weird stuff. We found ways to destroy sounds, like taking the sample rate down to 2 bits, that you're not able to do in [Passport's] Alchemy or [Digidesign's] Sound Designer, and weird modulated things where you can really get shitty sounds. Maybe we'll incorporate, say, 30 of our favorite destructive processes — again, Bob Clearmountain would have no use for this [*laughs*]. Stuff like, "What if you took this and reduced its dynamic range down to zero?" Or, "What would happen if you took the sample rate down to this?" Whatever. We're collecting as many ideas as we can.

Have you set any solid goals or a time-frame to realize this?

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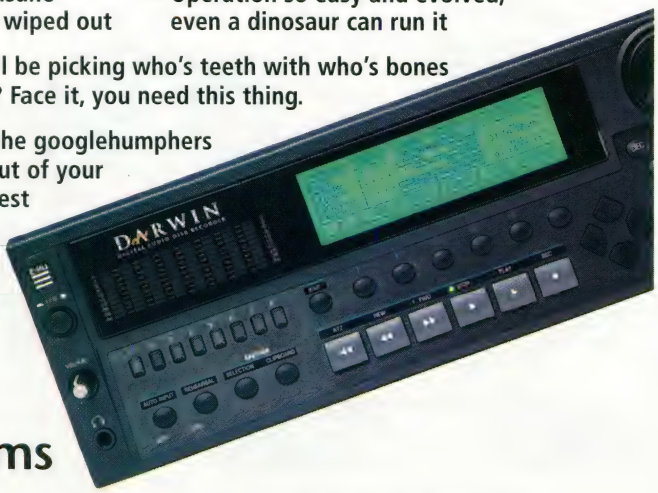

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TRENT REZNOR

ing about getting some people involved. No real time-frame yet.

What do you think about the current crop of music technology?

Well, being a gear-head, I hadn't been interested in any new stuff that had come out, as far as keyboards, with the exception of the K2000. There was the hump of everything being workstations and sounding the same, the sample-playback shit just was not interesting. However with the modeling stuff — we picked up the Yamaha VL1 after everyone said it was a piece of shit, and we borrowed it for an afternoon in New York, and I was probably the most blown away by it than with any keyboard I've met in years. I haven't delved into it far enough to know, "Oh it can only do these three sounds," or not, but. . . . Like, I remember when I first heard a [Roland] D-50. It would have taken me five keyboards to make that sound, and that first moment it was, "Whoa!" And then you quickly realize that that's all it really can do. But the idea of organic sounds is right in line with a lot of things I've been fuckin' around with. I'm glad that somebody's put the research into a high-end piece of gear that's very non-commercial that has the ability to make some truly new-type sounds that are cool. I'm totally into that idea of technology. I also got the Roland guitar thing, the VG-8, and I think it's excellent for certain things. Just to be able to tune each string independently made it worthwhile. We were going to use it on tour but decided it probably wasn't a good idea, yet. But we used it on the new Marilyn Manson record and I think it's a cool idea, a cool concept. I think the clean sound is fantastic. If you look at it as an elaborate effects processor, I think it could succeed on that level.

And you've got a Nord Lead.

I've got *four* of 'em now. I think that is the coolest-sounding analog-type synth. I just love it. And I think it looks cool, and that's pretty much the main reason I got it [*laughs*]. I love that keyboard, and I know it's going to make a lot of the [analog] shit I have now obsolete — like, it doesn't go out of tune.

What software do you prefer these days?

I tried other sequencers, but I keep going back to [Opcode] Vision. I couldn't be happier with it. [He also wrenches Digidesign's Pro Tools daily.]

Do you get much time to play keyboards away from the band?

I usually have the K2000 in my hotel room, but now that I have a place to put it, I'm going to get a piano. That was a nice thing about the Record Plant, they had a piano and I could just sit down and play alone.

Perhaps a solo piano album is in your future?

Yeah, in a couple years when no one likes me anymore.

You might be ideally suited to interpret, say, Cowell's "Banshee."

Yeah, but with hammers and nails and shit all over the thing. [*Laughs.*] ■

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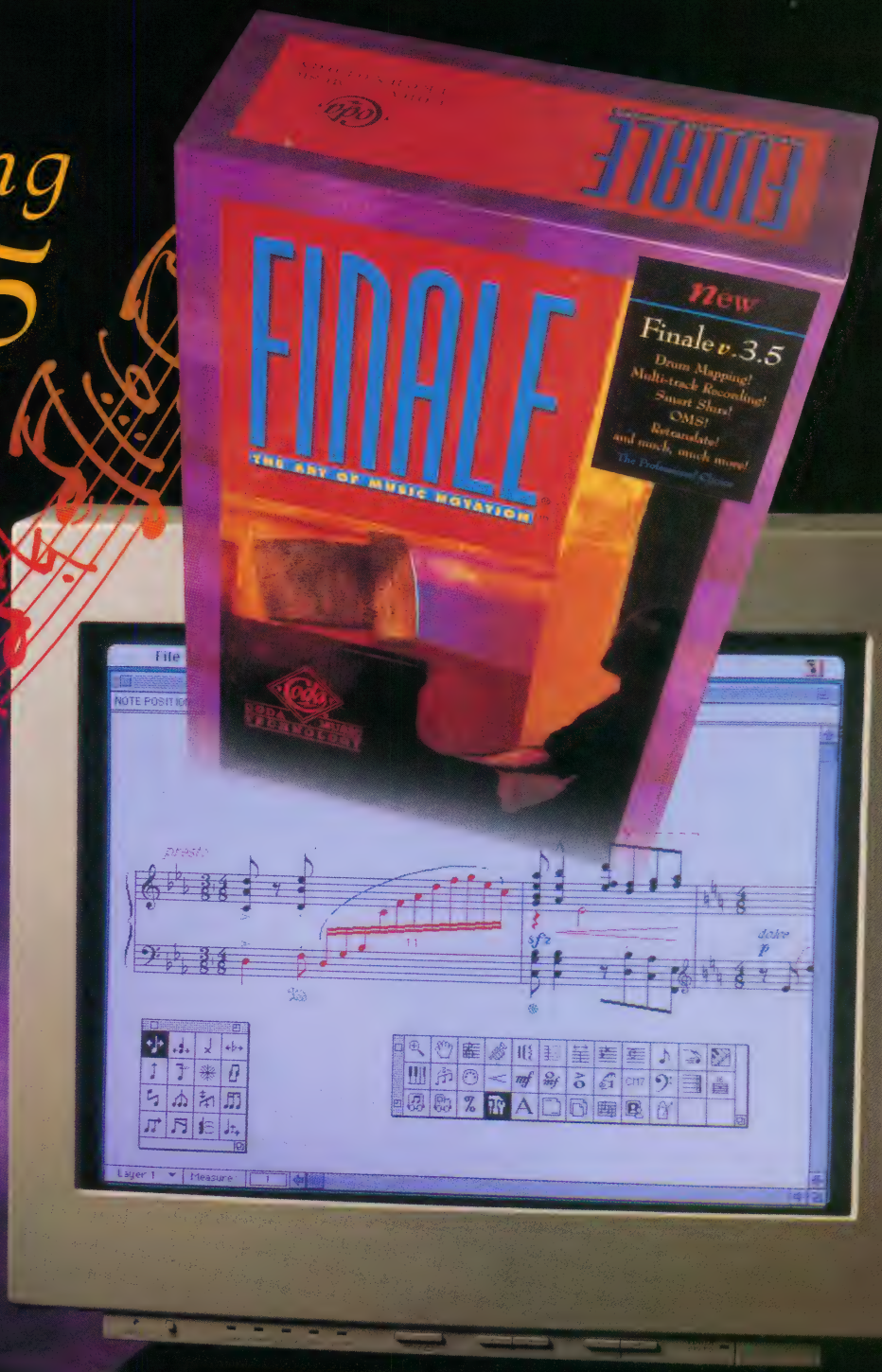

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They said it couldn't be done. And they were right. (Actually, the staff insisted it couldn't be done. The boss said it could too. The boss was right, as usual.)

Our very first Buyer's Guide, in December 1990, was what we called "the phone book," a Grand Coordinated List Of Everything. In the years since, we've devoted our Buyer's Guides to more in-depth coverage of narrower product categories. After five years, though, it was obviously time for the phone book again. Trouble is, the music industry has grown in the years since — and our staff hasn't. Even the boss was forced to admit that the Grand Coordinated List Of Everything would be suicidal.

So we pared the concept down just a bit. Since last year's Buyer's Guide was devoted to music software, we turned this issue into a Hardware Buyer's Guide. Our guiding principle: If it needs a computer to operate, it's off the table. No software, and no hard/soft hybrids (hard disk recording systems, for instance) that require a computer. Admittedly, this is a disservice to readers who are interested in otherwise similar products — notably digital recorders — some of which require a computer, and some of which don't. But with the spectre of two million soundcards looming in the background, half of which have announced that they'll be adding multitrack recording in their Very Next Update, we felt we had to draw a hard line.

The editorial knife was also wielded to trim away cassette multitrack decks, since we covered those with reviews and a chart last month. We eliminated hardware such as 48-channel consoles and tape decks that are mainly of interest to large studios. Project studio gear, yes; downtown studio, no. Home organs with auto-accompaniment — nobody reads *Keyboard* to find out about that stuff, so skip it. We would have liked to cover acoustic pianos, since they're central to keyboard artistry, but two pianos of the same model, with all of the same specs, can differ wildly in sound and playability, so piano listings would have been largely meaningless.

The types of gear that we figured are central to our readers' music-making — synthesizers, samplers, programmable effects processors, digital pianos and organs, modular digital multitrack recorders — rated feature-by-feature charts. Everything else had to be relegated, with regret, to simple lists. Maybe the most important list is the list of manufacturer addresses, phone and fax numbers, and e-mail contacts; you'll find it on page 162.

Our effusive thanks go out to the long-suffering manufacturer and distributor personnel who filled out our obsessively detailed questionnaires. Many of them have products in multiple categories, and in each category they might have from two to a dozen models. So they were receiving multi-page questionnaires from four or five different *Keyboard* editors, and having to fill them out as many as 40 or 50 times.

And it's not as if these hard-working folks have nothing better to do than look up (or test) the LFO rate range of their General MIDI modules. Many of them have bosses who assign them other tasks from time to time, and their pressing deadlines (to say nothing of business trips) don't necessarily dovetail neatly with our need to pull the completed forms from our creaking, groaning fax machine no later than the 15th of September.

Multiply this scenario by several hundred pieces of gear, and you'll begin to see why this year's Buyer's Guide occasionally falls a millimeter or two short of utter perfection. The "???" entry in the charts, for instance, means we couldn't track down the information before our deadline — possibly because the U.S. distributor couldn't get a reply from the Japanese engineering staff in time, or possibly because we were too busy harassing some other manufacturer who was a little late sending us *all* of the data on a whole line of instruments.

While we did our best to catch and fix the more glaring anomalies, we can't promise that a few errors didn't make it into the published charts. Shocking as it may seem, when filling out questionnaires (even questionnaires that are 100% unambiguous about the specific information being requested, which ours weren't, always), individuals who work in marketing departments have been known to interpret both synthesizer terminology and the features of their own gear in ways that are, shall we say, optimistic. One manufacturer's representative filled in a blank in the synthesizer questionnaire with the seemingly rock-solid information that his instrument had a 44.1kHz sample playback clock rate. He also faxed us some helpful pages from the back of his own owner's manual, however; in those pages the clock rate was clearly listed as . . . well, to disguise this individual's identity, let's just say it was less than 44.1kHz. We wouldn't want to single him out for abuse, since he wasn't the only offender.

If a fact is garbled, or missing entirely, we hope you'll drop us a line and let us know, so we can run a list of corrections in the Feb. '96 issue. But please, in the interest of our frayed nerves, try to restrain the sarcasm. If your letter begins, "Don't you hopeless bozos know that the XPC-9009 has three multimode filters per oscillator? How could your research be so disgustingly sloppy?", just remember: We still have that videotape of you and your little brother doing unspeakable things to a Yorkshire terrier. You wouldn't want it to show up on *60 Minutes*, would you? Need we say more? —*Jim Aikin*

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BUYER'S GUIDE

Synthesizers & TONE MODULES

BY **JIM AIKIN**

Where would we be without synthesizers? (I don't even want to think about it.) As you peruse the synth chart on the following pages, the standard *caveat* applies. The most important thing about any instrument is what it sounds like — and you won't find that out by reading a chart. What you *can* get from a chart are some preliminary ideas about which instruments come close to meeting your hardware needs. If you need a built-in sequencer, for instance, you can pretty much cross off anything that says "none" in the sequencer line. If your budget tops out at $1,500, a glance at the chart will reveal that a shiny new Kurzweil K2500 is not in your future.

An instrument's real-time responsiveness to the player's input gestures is almost as important as the sound itself — and here, a chart can be quite helpful. Check the info under "key response," "left-hand controllers," and "rear-panel control inputs," for starters. Also look under "programmable" to find out which instruments can record parameter changes into a sequencer as sys-ex data, under "number of LFOs" for real-time rate modulation, and under "number of simultaneous FX" for real-time effects modulation.

Four years ago, the synthesizer chart in our Synth & Sampler Buyer's Guide (Dec. '91) had 35 columns covering a total of 60 different instruments. This time, we had to contend with 55 columns and a total of 92 instruments and modules. A few instruments from the 1991 listings are still represented in the new chart: the Ensoniq SQ-1 Plus and SQ-2, the Korg 01/WFD, the Kurzweil K2000, the Oberheim Matrix-1000, the Studio Electronics SE-1, and the Yamaha SY99. Most have fallen by the wayside — the entire Roland D series, for instance, Yamaha's TG line, and the Korg M and T synths. At the same time, Alesis, Clavia, Marion Systems, and several other manufacturers have entered the fray.

A quick look at some items of information that may not be clear at a glance:

Audio Outputs. The number refers to the absolute number of analog output signals. Usually these will appear as discrete 1/4" jacks, but not always. A digital output, if available, is also noted.

Disk Drive. "HD" means a high-density 3.5" floppy drive. "DD" means double-density. Of the synthesizers, only Kurzweil K2000 and K2500 (which are also listed in the sampler chart, starting on page 45) offer an optional internal hard drive.

Keyboard. We made an effort to note the number of separate MIDI transmit zones on the keyboard, but this information is fragmentary. If the chart doesn't note the number of zones, that doesn't mean the keyboard won't transmit on multiple zones. We did distinguish between weighted, semi-weighted, and synth-action keys.

Key Response. We noted velocity (V), release velocity (RV), channel aftertouch (CA), and polyphonic aftertouch (PA). With modules that have no keyboards, this category refers to the type(s) of MIDI data that the module can respond to.

Rear-Panel Control Inputs. We did our best to separate on/off footswitch (ftsw) inputs from continuous (sweep) inputs. A footswitch input, if present, is presumably assignable as a sustain pedal input, so it might be a good guess that "sustain" means the footswitch input is *not* assignable to other functions. On the other hand, who knows?

Playback Clock Rate. Several manufacturers misinterpreted this question as referring to the clock rate at which their factory waves were originally sampled, *not* the rate at which the samples are played back. We did our best to clarify the data, but we're making no promises.

Maximum Polyphony. The first number in this field should be unambiguous: It's the total number of oscillators in the instrument. Unless . . . what if you *have* to use two oscillators in a single patch? In that case, the number shown is the number of notes you can play at once, not the number of oscillators. The second number is the number of oscillators that can be programmed into a single single-type program.

Programmable. The item "RT sys-ex" on this line refers to the ability to transmit MIDI sys-ex data as a single parameter is edited from the front panel, so that edits can be recorded for expressive purposes in a sequencer. With instruments that have extensive controller input routings, this feature may not be necessary.

Number of Envelopes. This refers to the number of envelopes available for a single-oscillator voice, *not* the number of envelopes available for an entire two-oscillator or four-oscillator patch. At least, that's the question we tried to get an answer to. The time/level figures are given for the filter envelope, which is often the most capable envelope, or at least a valid representative, in a design where the pitch, filter, and amplitude envelopes may all have slightly different designs. An ADSR envelope has three times (attack, decay, and release) and one level. We chose this more specific method of showing envelope data to avoid having an ADSR described as a "4-stage envelope." Even so, a few manufacturers wrote "4-stage" in answer to the question "how many time parameters," and left the level parameters question blank. We're sure they're very nice envelopes, but you probably won't find out exactly how they're set up by reading the chart.

Number of LFOs. As with the envelopes, we intended this category to refer to the number of LFOs per single-oscillator voice. In some synths, however, a pool of LFOs can be shared by several oscillators within a voice, so the number may refer to the patch rather than the voice. The "wf" number refers to the number of waveforms (square, triangle,

continued on page 52 ►

	Alesis Quadrasynth Plus Piano, S4 Plus module	Alesis QS6	Clavia Nord Lead	Doepfer MS-404
current operating system	2.0	1.0	1.x	1.04
display	QS: 5-1/2" x 1-1/4"; S4: 5" x 1-1/8"; backlit LCD, graphic	2 x 16 LCD	2-digit LED	4 LEDs
audio outputs	4; 4-chan ADAT optical, hdphon	2, hdphon	2, hdphon	1
disk drive	no	no	no	no
keyboard	76 semi-weighted	61 semi-weighted	49-key synth, 4 zones	no
key response	V, RV, CA, PA (receive only)	V, RV, CA, PA (receive only)	V	V
Left-hand controllers	4 prog knobs; QS only: PB, mod	PB, mod, slider	PB stick, assignable mod wheel, oct shift, 26 knobs	no
rear-panel control inputs	QS only: sustain, 2 prog sweep	sustain, prog sweep	expression/sustain pedal	none
playback clock rate	48kHz	48kHz	100kHz	—
max polyphony/# of voices per prog	64/4	64/4	4 (upgrade to 12)/2	1
synthesis type(s)	sample playback	sample playback	digitally modeled analog w/ wave mod & osc sync	analog
programmable	yes	yes	yes	no
voice filter type	lowpass	lowpass	resonant low/band/hi, 2/4 pole	24dB/oct lowpass, resonant
# of envs, filter env time/level params	3; 5 time, 2 level	3; 5 time, 2 level	3; 3 time, 1 level	1; 3 time, 1 level
# of LFOs/# of waveforms	3; 8wf, RT mod, 0.07–26Hz	3; 8wf, RT mod, 0.07–26Hz	2 (shared), 1 global; 3wf, RT mod, sync, .2–100Hz	2 (0.01Hz–5kHz), 1wf
output routing per oscillator	set pan, send	set pan, send	—	none
modulation routings	24 x 24 matrix; 25 src, 32 dest	24 x 24 matrix; 25 src, 32 dest	standard	LFO & env only
drum kits	27 ROM (76 keys), up to 128 RAM: 40 keys, layer, filt, pan/send, decay, ±12 semitones	27 ROM (76 keys), up to 128 RAM: 40 keys, layer, filt, pan/send, decay, ±12 semitones	none	none
memory	QS: 24Mb; S4: 20Mb; single: 512 ROM (incl GM), 128 RAM; multi: 400 ROM, 100 RAM	8Mb; single: 512 ROM (incl GM), 128 RAM; multi: 400 ROM, 100 RAM	single: 59 ROM, 40 RAM	none
memory expansion	8Mb PCMCIA card (programs or samples)	8Mb PCMCIA card (programs or samples)	optional PCMCIA card slot (297 single, 300 multi)	no
tuning tables	none	none	none	none
# of multi parts/output routings in multis/other multi features	16; out, FX	16; out, FX	4/out	none
sequencer	none	none	none	none
# of simul FX/# of FX processors; # of alg, real-time control	8/4; 19 alg, RT (2 ins)	8/4; 19 alg, RT (2 ins)	none	none
other features	Soundbridge software allows SampleCell & AIFF sounds to be burned onto flash RAM cards; S4 only: multi MIDI reception switchable to single channel	RS232/422 jack; ships w/ CD-ROM containing Soundbridge software, Steinberg Cubase Lite (Mac or PC), GM sequences, sample files, & ed/lib software	all knobs send/receive MIDI ctrlr data; env & filt triggering via MIDI; morph btwn linked programs using mod wheel	metallic sounds due to LFO freq range; internal jumper programming
dimensions (inches), weight	QS: 48 x 14 x 4-1/2, 39 lbs; S4: 19 x 7 x 1-3/4, 4-1/2 lbs	36 x 11-1/2 x 3-1/2, 19 lbs	34 x 10-3/8 x 4-1/8, 14-3/4 lbs	12 x 3 x 1-3/4; 2 lbs
suggested retail price(s)	S4: $1,099; QS: $1,699; RAM card: $129, 8Mb sample ROMs: $169–$229; flash RAM: $149.99–$369.99	$1,099; flash RAM: $149.99–$369.99	$2,395 ($1,995 rack); 8-voice expander w/ PCMCIA slot: $695	$499
Keyboard Report date:	Quadrasynth: June '94; Quadrasynth Plus: Sept. '95	—	June '95	Nov. '95

EMS Synthi A	E-mu Proteus FX	E-mu Classic Keys	E-mu Vintage Keys Plus	E-mu Morpheus, Ultra Proteus
Mk 2	4.0	4.11	2.0	original version
incandescent envelope lamp	2 x 16 backlit LCD	2 x 16 backlit LCD	2 x 16 backlit LCD	2 x 14 backlit LCD
5, hdphon	2, hdphon	2, hdphon	6, hdphon	6, hdphon
no	no	no	no	no
none	none	none	none	none
no MIDI input	V, CA	V, CA, PA	V, CA, PA	V, CA, PA, 16z
36 rotary knobs, joystick	—	—	—	—
none	none	none	none	none
—	39kHz	39kHz	39kHz	39kHz
monophonic/3	32/2	32/2	32/2	32/2
analog; osc shape control	sample playback	sample playback	sample playback	sample playback
no	yes	yes	yes	yes; multi
resonant lowpass	none	none	2-pole/4-pole resonant lowpass	14th order 3D vector (dual multi res)
1; 4 time, 1 level	3; 3 time, 2 level	3; 3 time, 2 level	3; 3 time, 2 level	3; 3 time, 2 level
1; 2 variable wf, RT mod, 0.025–500Hz	2 (shared); 5wf, RT mod, .05–25Hz	2 (shared); 5wf, RT mod, .05–25Hz	2 (shared); 5wf, RT mod, .05–25Hz	2 (shared); 4wf, RT mod, .05–25Hz
set & dyn pan	set & dyn pan	set & dyn pan	set & dyn pan	set & dyn pan
16 src, 16 dest	14 x 14 matrix, 12 src, 57 dest	14 x 14 matrix, 12 src, 57 dest	14 x 14 matrix, 12 src, 57 dest	22 src, 47 dest
—	4 ROM (drums tunable via user tuning table)	8 ROM (drums tunable via user tuning table)	10 ROM (drums tunable via user tuning table)	8 ROM (61+ keys)
—	8Mb; single: 256 ROM, 256 RAM	8Mb; single: 256 ROM, 256 RAM	16Mb; single: 256 ROM, 256 RAM	8Mb wave ROM (Morph), 16Mb (Ultra); filter arrays: 197 (Morph), 288 (Ultra); single: 128 ROM, 128 RAM; 128 RAM multi; pgm card slot
—	no	no	no	no
—	5 ROM, 1 user, 127 keys, full range per key	5 ROM, 1 user, 127 keys, full range per key	5 ROM, 1 user, 127 keys,full range per key (1.56 cent resolution)	1 table, 127 keys, full range per key (1.56 cent resolution)
—	16/FX; overflow, map	16/FX; overflow, map	16/out; overflow, map	16/out; overflow, map
—	none	none	none	none
spring reverb, ring mod	2/2, 26 alg, RT mod	2/2, 35 alg, RT mod	none	2/2, 31 alg
2 ext CV or audio ins, built-in speakers	—	—	sounds available as upgrade board for original Vintage Keys ($295)	2 looping function generators, reloop sample ROM
18-1/2 x 15 x 4-1/2	19 x 6 x 1-3/4, 4-1/2 lbs	19 x 6 x 1-3/4, 4-1/2 lbs	19 x 8-1/2 x 1-3/4, 6 lbs	19 x 8-1/2 x 1-3/4, 6-3/4 lbs
$2,900; KS sequencer keyboard (only avail reconditioned): $480	$745	$795	$1,295	Morph: $1,495; Ultra: $1,795
—	Sept. '94	—	Vintage Keys: May '93	Mar. '94 (Morph)

Manufacturer contact list on page 162

	Ensoniq KS-32, SQ-1 Plus, SQ-2	Ensoniq KT-76, KT-88	Ensoniq TS-10, TS-12	Generalmusic S2, S3, S2R Turbo
current operating system	KS-32: 3.10; SQ: 2.03	1.62	3.05	2.0
display	2 x 16 backlit LCD	2 x 16 backlit LCD	2 x 40 char fluorescent	240 x 64 pixel, neon backlit, graphic
audio outputs	2, hdphon	2, hdphon	4, hdphon	6, hdphon
disk drive	no	no	HD floppy	HD
keyboard	KS-32 & SQ-2: 76; SQ-1 Plus: 61; KS-32 only: weighted; 8 zones	weighted; KT-88: 88; KT-76: 76; 8 zones	TS-10: 61-key synth; TS-12: 76-key weighted	S2 & S3: weighted synth action; S3: 76; S2: 61; 16 zones
key response	V; KS-32 & SQ-2: CA, PA (receive only); SQ-1 Plus: CA/PA receive only	V, CA, PA (receive only), 8z out	V, CA, PA (TS-10 only), 12z out	V, RV, CA, PA
Left-hand controllers	PB, mod	PB, mod	PB, mod, 2 buttons	S2 & S3: 2 prog wheels, 7 buttons, 7 sliders
rear-panel control inputs	dual ftsw, CV sweep	dual ftsw, CV sweep	2 dual ftsw, CV sweep	volume pedal, 2 ftsw
playback clock rate	30kHz	36kHz	30kHz	41.6kHz
max polyphony/# of voices per prog	32/3	64/3	32/6	32/2
synthesis type(s)	sample playback, wavetable modulation	sample playback, wavetable modulation	sample playback, wavetable modulation	sample playback
programmable	yes	sys-ex	yes; multi	yes
voice filter type	low/hi/band (2 per voice in series)	low/hi/band (2 per voice in series)	low/hi/band (2 per voice in series)	resonant low/band/hi, parametric boost/cut
# of envs, filter env time/level params	3; 4 time, 4 level	3; 4 time, 3 level	3; 5 time, 4 level	8 (4 key-on, 4 key-off); 10 time, 10 level
# of LFOs/# of waveforms	1; 7wf, RT mod, .05-21Hz	1; 7 wf, 0-20Hz	1; 7wf, RT mod, 0-20Hz	1, 1 global; 6wf, RT mod, sync, 1–100Hz
output routing per oscillator	set pan	set & dyn pan	set & dyn pan	set & dyn pan
modulation routings	15 src, 6 dest	15 src, 7 dest	15 src, 9 dest	standard
drum kits	20 ROM, up to 80 RAM, 17 keys, filt, AR env, pan, ±48 semitones	20 ROM, up to 80 RAM, 64 keys, filt, AR env, pan, FX send, ±48 semitones	24 ROM, up to 120 RAM, 61 keys, filt/env templates, 4 layer, pan, ±15 semitones	20 ROM (76 keys), 1,548 RAM (128 keys); filt, full env, pan, send, ±88 semitones
memory	3Mb wave ROM; single: 100 ROM, 80 RAM; up to 100 RAM multis; pgm card slot	6Mb wave ROM; single: 228 ROM (incl GM), 80 RAM; multi: 10 ROM, 100 RAM; pgm card slot	6Mb wave ROM, 2Mb sample RAM; single: 317 ROM (incl GM), 120 RAM; multi: 180 ROM, 120 RAM	6Mb wave ROM; single: 500 ROM (incl GM), 1,548 RAM; multi: 100 ROM, 100 RAM; 2Mb sample RAM (Turbo only), .5Mb flash RAM
memory expansion	seq to 58,000 notes	seq to 106,500 notes w/ RAM card	sample RAM to 8Mb, seq to 97,000 notes	2Mb sample RAM (optional on standard unit, standard on Turbo)
tuning tables	none	none	1 per program/88 keys/full range per key	4 tables; 128 keys, ±88 semitones, ±63
# of multi parts/output routings in multis/other multi features	8/FX	8/FX	12/out/FX; xmit prg chg remap	16; out, FX send; voice reserve, LFO, filt, env offset
sequencer	16 trax, 1 ch/trk, 30 songs, 8,500 notes, 96 ppq, ee, bbc, MC/SPP	16 trax, 1 ch/trk, 30 songs, 6,500 notes, 96 ppq, ee, bbc, MC/SPP	24 trax, 1 ch/trk, 60 songs, 30,000 notes, 96 ppq, ee, swing, bbc, MC/SPP	16 trax, 16 ch/trk, 10 songs, 250,000 notes, ee, bbc, chase, MIDI files, MC/SPP, 192 ppq
# of simul FX/# of FX processors; # of alg, real-time control	3/1, 13 alg, RT	4/1, 13 alg, RT	4/1, 73 alg (692 var), RT	2/2; 32 alg, RT (2 ins)
other features	seq audition edits, tap tempo	transpose, 39 preset env templates	load ASR/EPS samples, preset env templates, copy utilities, seq audition edits	prog chg remap; reads samples from Akai & DOS disks; load while play; onboard graphic editor
dimensions (inches), weight	KS-32: 49-1/2 x 14 x 4-1/2, 49 lbs; SQ-1 Plus: 40-3/8 x 13-3/8 x 5-1/8, 25 lbs; SQ-2: 48-4/3 x 13-3/8 x 5-1/8, 30 lbs	KT-88: 56-3/4 x 15-5/8 x 5, 59 lbs; KT-76: 50-1/2 x 15-5/8 x 5, 51 lbs	TS-10: 40-3/8 x 14-1/2 x 4, 37 lbs; TS-12: 50-1/2 x 15-5/8 x 5, 55 lbs	S2: 41-1/2 x 13-3/4 x 4-1/2, 35 lbs; S3: 49-1/2 x 13-3/4 x 4-1/2, 41 lbs
suggested retail price(s)	SQ-1 Plus: $1,195; SQ-2: $1,395; KS-32: $1,995; RAM card: $124.95, ROM card: $99.95	KT-76: $2,495; KT-88: $2,695; MS-1 music stand: $49.95, RAM card: $179.95, ROM card: $99.95	TS-10: $2,695, TS-12: $2,995; read-only SCSI: $249.95	S2R: $1,995; S2: $2,795; S3: $3,145; 2Mb flash RAM: $595
Keyboard Report date:	Nov. '92	June '95	Sept. '93, Sept. '94	Jan. '93, Apr. '95

Generalmusic SX2, SX3	Kawai KC20, GMega LX	Kawai K-11, GMega	Korg 05R/W	Korg x5, x5D, x5DR
1.05	1.07	1.0	12	12
240 x 16 pixel, neon backlit, graphic	KC20 only: 2 x 16 backlit LCD	2 x 16 backlit LCD	2 x 16 backlit LCD	2 x 16 backlit LCD
2, hdphon	2, hdphon	2, hdphon	2, mini hdphon	2, mini hdphon
HD	no	no	no	no
weighted synth action; SX3: 76; SX2: 61; 16 zones	KC20 only: 61-key synth, 2 zones	K-11 only: 61-key synth; 4 zones	none	x5 & x5D: 61-key synth
V, RV, CA, PA (receive only)	V	V, CA	V, CA	V, CA (receive only)
PB, mod	KC20 only: PB, mod	K-11 only: PB, mod	—	x5, x5D: PB, mod wheels
sustain, volume pedal, 2 ftsw	KC20 only: sustain pedal	K-11 only: sustain pedal	none	x5 & x5D: two assignable ftsw/sweep
41.6kHz	???	44.1kHz	???	???
32/2	28/1	32/2	32/2	x5: 32/2; x5D & x5DR: 64/2
sample playback	sample playback	sample playback, AM	sample playback	sample playback
yes	no	yes; RT sys-ex	yes; RT sys-ex	yes; RT sys-ex
resonant low/band/hi, parametric boost/cut	—	resonant low/hi, band/notch w/ series/parallel link	lowpass	lowpass
8 (4 key-on, 4 key-off); 10 time, 10 level	—	2; 4 time, 3 level	3; 4 time, 2 level	3; 4 time, 2 level
1, 1 global; 6wf, RT mod, 1–100Hz	—	1; 4wf	2; 6wf	2; 6wf
set & dyn pan	—	no	set & dyn pan, send	set & dyn pan, send
standard	—	standard	standard	standard
16 ROM (88 keys), 128 RAM (128 keys); filt, full env, pan, send, ±88 semitones	7 ROM	7 ROM, 7 RAM; 128 keys, filt, attack/decay, pan/send, 128-key tune range	8 ROM, 2 RAM; 60 keys, filt, decay, pan/send, ±12 semitones	8 ROM, 2 RAM; 60 keys, filt, decay, pan/send, ±12 semitones
6Mb wave ROM; single: 464 ROM (incl GM), 1,024 RAM; multi: 24 ROM, 24 RAM; .5Mb flash RAM	??? wave ROM; single: 160 ROM; KC20 only: multi: 64 RAM	6Mb; single: 256 ROM, 128 RAM (GM); multi: 64 RAM	6Mb; single: 136 ROM (incl GM), 100 RAM; multi: 100 RAM	x5: 6Mb; x5D: 8Mb; x5DR: 8Mb; single: 136 ROM (incl GM), 100 RAM; multi: 100 RAM
2Mb sample RAM	none	none	none	none
4 tables; 12 keys, ±63 fine-tune	none	55 preset tuning tables	10 ROM, 1 RAM; 12 keys, ±1/2 semitone	10 ROM, 1 RAM; 12 keys, ±1/2 semitone
16; FX send; voice reserve, LFO, filt, env offset, pan	16	32; FX send; K-11 only: 4-way split/layer; odd/even MIDI	16/out, FX; overflow	16/out, FX; overflow
16 trax, 16 ch/trk, 8 songs, 250,000 notes, ee, bbc, chase, MIDI files, MC/SPP, 192 ppq	none	none	none	none
2/2; 32 alg, RT (2 ins)	1; 6 alg	1/1; 6 alg	4/2, 48 alg, RT mod	4/2, 48 alg, RT mod
opt video/RGB outputs, lyric display, generates chord display; 64 preset accomp styles, 32 prog styles (18 patt per style); bass pedalboard input; opt lyric/chord editor disk	KC20 only: sends any controller from mod wheel; GMega LX has no front panel controls (operations controlled via MIDI)	2 MIDI ins, 2 MIDI outs, Mac serial port	serial computer interface	serial computer interface
S2: 41-1/2 x 13-3/4 x 4-1/2, 35 lbs; S3: 49-1/2 x 13-3/4 x 4-1/2, 41 lbs	KC20: 38 x 8-1/8 x 3-1/8, 9 lbs; GMega LX: half-rack module	K-11: 36-7/8 x 10-1/4 x 3, 14-1/4 lbs	9-1/2 x 8-1/2 x 1-3/4, 2-1/2 lbs	x5 & x5D: 35-1/2 x 10 x 3-1/4, 10 lbs; x5DR: 9-1/2 x 8-1/2 x 1-3/4 2-7/8 lbs
SX2: $2,495; SX3: $2,795; 2Mb video interface: $300; sample RAM: $195, pedalboard: $225, lyric editor disk: $19.95	$699	GMega: $499; K-11: $899	$699	x5DR: $959; x5: $1,099; x5D: $1,399
Sept. '95	—	Mar. '93 (GM module roundup)	July '94	—

Manufacturer contact list on page 162

	Korg Wavestation SR	Korg Prophecy	Korg x2, x3	Korg 01/W Pro-X, 01/Wfd
current operating system	1.15	13	50	62
display	2 x 16 backlit LCD	2 x 40 backlit LCD, graphic	"custom" backlit LCD, text only	240 x 64 pixel, backlit, graphic
audio outputs	4, hdphon	2, mini hdphon	x2: 4; x3: 2; hdphon	4, hdphon
disk drive	no	no	DD	DD
keyboard	none	37-key synth	x2: 76-key synth; x3: 61-key synth	Pro-X: 88-key weighted, 8 zones; fd: 61-key synth
key response	V, CA	V, CA	V, CA	V, CA
Left-hand controllers	—	PB, 2 mod, ribbon	joystick (PB, mod, breath)	joystick (PB, mod, breath)
rear-panel control inputs	none	ftsw, sweep	sustain, assignable ftsw/sweep	sustain, 2 assignable ftsw/sweep
playback clock rate	???	???	???	???
max polyphony/# of voices per prog	32/4	1/3	32/2	32/2
synthesis type(s)	sample playback, wave sequencing, vector env	physical modeling	sample playback	sample playback, waveshaping
programmable	yes; RT sys-ex	yes; RT sys-ex	yes; RT sys-ex	yes; RT sys-ex
voice filter type	lowpass	resonant low/hi/band/notch	lowpass	lowpass
# of envs, filter env time/level params	2; 4 time, 4 level	4; 4 time, 5 level	3; 4 time, 2 level	3; 4 time, 2 level
# of LFOs/# of waveforms	2; 5wf, RT mod	4; 30wf, RT mod, 0–60Hz	2; 5wf	2; 5wf
output routing per oscillator	set pan	set & dyn pan	set & dyn pan, send	set & dyn pan
modulation routings	13 src	111 src, 36 dest	standard	standard
drum kits	none	—	8 ROM, 4 RAM; 60 keys, filt, decay, pan/send, ±12 semitones	4 RAM; 60 keys, filt, decay, pan/send, ±12 semitones
memory	4Mb; single: 280 ROM, 105 RAM; multi: 400 ROM, 150 RAM	128 RAM	x2: 8Mb; x3: 6Mb; single: 136 ROM (incl GM), 200 RAM; multi: 200 RAM	Pro-X: 10Mb; fd: 6Mb; single: 200 RAM; multi: 200 RAM
memory expansion	prog & wave card slots	program card slot	wave & prog card slots	wave & prog card slots
tuning tables	4 ROM, 12 RAM, 12 keys, ±1 semitone	9 ROM, 2 RAM, 12 keys, ±1 semitone	10 ROM, 1 RAM; 12 keys, ±1/2 semitone	4 ROM, 1 RAM; 12 keys, ±1/2 semitone
# of multi parts/output routings in multis/other multi features	16/out, FX; map prog chg	—	16/out, FX; overflow	16/out, FX; overflow
sequencer	none	none	16 trax, 1 ch/trk, 100 patterns, 10 songs, 32,000 notes, 96 ppq, ee, SMF, MC/SPP	16 trax, 1 ch/trk, 100 patterns, 48,000 notes, 10 songs, 96 ppq, ee, SMF, MC/SPP
# of simul FX/# of FX processors; # of alg, real-time control	4/2, 55 alg, RT mod	8/6, 6 alg, RT mod	4/2, 48 alg, RT mod	4/2, 48 alg, RT mod
other features	—	programmable arpegg sends/receives MIDI clock	—	—
dimensions (inches), weight	17-1/8 x 10-1/4 x 1-3/4, 8 lbs	29-1/8 x 11-1/4 x 4, 12-1/2 lbs	x2: 50-3/4 x 13-3/8 x 4, 29-3/4 lbs; x3: 41-1/2 x 13-3/8 x 3-3/4, 22 lbs	Pro-X: 58 x 20-1/4 x 5-3/8, 77-5/8 lbs; fd: 41-3/4 x 13-1/2 x 4-1/2, 30-5/8 lbs
suggested retail price(s)	$1,299	$1,599	x3: $1,875; x2: $2,199	fd: $2,645; Pro-X: $4,675
Keyboard Report date:	May '93	Jan. '96	—	Dec. '91

Korg i4s, i5s	Korg i1, i2, i3	Korg Trinity, Trinity Plus/Pro/Pro X	Kurzweil PC88, PC88MX	Kurzweil K2000, K2000R
???	58	???	1.0	3.18
i4s: 2 x 40; i5s: 2 x 20; both backlit	240 x 64 pixel, backlit, graphic	240 x 320 pixel backlit touchscreen, graphic	2 x 20 backlit LCD	64 x 240 pixel backlit, graphic
2, hdphon	2, hdphon	4, hdphon; Pro X only: digital	2, hdphon	4 (expand to 8), hdphon
DD	DD	HD/DD; Pro X: 543Mb internal hard drive	no	HD, optional int hard drive
61-key synth	i1: 88 keys, adjust weight; i2: 76-key synth; i3: 61-key synth	Trinity: 61-key synth; Pro: 76-key synth; Pro X: 88 weighted; 16 zones	88-key weighted, 4 zones	K2000 only: 61-key synth, 3 zones
V, CA	V, CA, 16 zones	V, CA	V, RV, CA, 4 zones	V, RV, CA, PA (receive only)
i4s: joystick (PB, mod); i5s: PB, mod button	joystick (PB, mod, breath)	joystick, ribbon, 2 switches	PB, mod wheels (both assignable), 4 sliders, 4 buttons, 3 prog switches	PB, mod, slider
sustain, assignable sweep, 5-switch multipin	sustain, assignable ftsw/sweep, 5-switch multipin	sustain, assignable ftsw, assignable sweep	2 ftsw, 4 sweep	2 assignable ftsw, sweep; trig ins on sampling models
???	???	48kHz	variable	variable (0-96kHz)
32/2	32/2	32/2	PC88: 32/4; MX: 64/4	24/3 (32 definable voices in drum mode, 1 drum chan)
sample playback	sample playback	sample playback	sample playback	sample playback, waveshaping, osc sync
i4s only: yes; RT sys-ex	yes; RT sys-ex	yes; RT sys-ex	no; limited RT timbre control	yes; RT sys-ex
lowpass	lowpass	resonant low/hi/band/ notch	lowpass	resonant low/ band/hi/notch, 12/24dB/oct, mult filt in series
3; 4 time, 2 level	3; 4 time, 2 level	3; 4 time, 5 level	5; 8 time, 7 level	3; 8 time, 7 level
i4s only: 1; 5wf	1; 5wf	2; 19wf, RT mod, .014-20Hz	2, 1 global; 26wf, RT mod, 0-24Hz	2, 1 global; 26wf, RT mod, sync, 0-24Hz
i4s only: set & dyn pan, send	set & dyn pan, send	set & dyn pan, send	set pan	set & dyn pan, send
standard	standard	26 src	—	40 x 36 matrix, 125 src, 40 dest
i4s: 6 ROM, 2 RAM; 60 keys, decay, pan/send, ±12 semi; i5s: 8 ROM; decay, pan/send, fine tune	6 ROM, 2 RAM; 60 keys, filt, decay, pan, send, ±12 semitones	12 RAM; ??? keys, decay, +24/–60 semitones	MX only: 12 ROM kits	11 ROM, up to 1,000 RAM; 128-key layout, full tune range; 32 layer, filt, env, pan/send
6Mb; single (incl GM): i4s 192 ROM, 64 RAM, i5s 128 ROM, 64 RAM	i1 14Mb, i2 8Mb, i3 6Mb; single: 192 ROM (incl GM), 64 RAM	24Mb; single: 256 RAM; multi: 256 RAM	PC88: 4Mb; MX: 6Mb; single: 64/269 ROM (PC88/MX); multi: 64 ROM, 127 RAM	8Mb; single: 200 ROM, 1,000 RAM; multi: 100 ROM, 800 RAM
no	no	8Mb flash RAM	PC88 only: VGM 32-voice GM board	up to 64Mb sample RAM, two 8Mb ROM wave/patch blocks
i4s only: 10 ROM, 1 RAM; 12 keys, ±1/2 semitone	10 ROM, 1 RAM; 12 keys, ±1/2 semitone	10 ROM, 2 RAM, one w/ 88 keys, one w/ 12 keys; ±1 semitone	—	17 ROM, 255 RAM; 12 keys, full range
16; i4s only: FX, overflow	16/out, FX; overflow	16/out, FX; overflow	16/out; overflow, remap; MX & VGM upgrade: FX assign	16/out, FX; remap
SMF playback from disk	16 trax, 1 ch/trk, 10 songs, 100 patterns, 40,000 notes, 96 ppq, ee, SMF, MC/SPP	16 trax, 1 ch/trk, 100 patterns, 20 songs, 80,000 notes, 192 ppq, ee, chase, SMF, MC/SPP	none	32 trax, 1 ch/trk, 255 patterns, 255 songs, 15,000 notes (30,000 events), 768 ppq, swing, ee, bbc, SMF, MC/SPP
4/2, 47 alg; i4s only: RT mod	4/2, 48 alg, RT mod	10/10, 114 alg, RT mod; audio in w/ HD record option	PC88: 2/2, 48 alg; MX & VGM: 4/2, 96 alg; RT mod	4/1, 27 alg, RT mod
auto-accompaniment; i5s: serial computer interface	auto-accompaniment	seq can sync to optional hard disk recorder; SCSI, digital audio out (optional on Trinity, Pro); Plus & Pro include Prophecy expan board	arpeggiator	trigger seq from kbd, ROM multi-samp layout remap, SCSI, upgrade to full-function sampler, read/write AIFF & .WAV files
i4s: 46-1/2 x 15-1/8 x 5-1/2, 40-3/4 lbs; i5s: 40-1/2 x 14 x 4-1/2	i1: 59-1/4 x 21-1/8 x 7, 96 lbs; i2: 50-1/2 x 13-3/4 x 4-3/4, 38-1/8 lbs; i3: 42-3/8 x 13-3/4 x 4-3/4, 32-3/8 lbs	Trinity: 43 x 13-3/4 x 5, 31 lbs; Pro: 51 x 13-3/4 x 5, 37-1/2 lbs; Pro X: 60-5/8 x 18-1/4 x 5-3/4, 69 lbs	54-1/4 x 14 x 4-1/4, 54 lbs	K2000: 41 x 13-1/2 x 4-1/8, 26 lbs; K2000R: 17 x 14 x 5, 22 lbs
i4s: $2,645; i5s: $1,800	i3: $3,250; i2: $3,999; i1: $5,750	Trinity: $3,599; Plus: $3,999; Pro: $4,799; Pro X: $???; hard disk recording: $???	PC88: $2,395; PC88MX: $2,850; VGM upgrade (converts 88 to MX): $395	K2000R: $2,895; K2000: $2,995; sampling upgrade: $699/749; battery-backed P-RAM: $395, 8Mb wave blocks: $395
—	Jan. '94	—	Oct. '94	Mar. '92, June '93

Manufacturer contact list on page 162

Synths/Tone Modules

	Kurzweil K2500, K2500X, K2500R	Marion Systems MSR-2, Prosynth	Novation BSR-1 Bass Station Rack	Oberheim Matrix-1000
current operating system	1.0	MSR: 1.09/1.13; Prosynth: 2.0	1.5	1.11
display	64 x 240 pixel backlit LCD, graphic	2 x 20 fluorescent	2-char LED	3-digit LED, 6 LEDs
audio outputs	8, hdphon	2	1, mono hdphon	1
disk drive	HD, optional int hard drive	no	no	no
keyboard	K2500: 76-key semi-weighted; K2500X: 88-note weighted; 8 zones	none	none	none
key response	V, RV, CA, PA (receive only)	???	V	V, RV, CA
Left-hand controllers	2500 & 2500X: PB, mod, ribbon, pressure strip, 8 sliders, 10 buttons	—	—	—
rear-panel control inputs	2500 & 2500X: 4 ftsw, 2 sweep, breath	none	gate in/out, CV in/out	none
playback clock rate	variable (0-96kHz)	—	—	—
max polyphony/# of voices per prog	48/3 (32 definable voices in drum mode, 8 drum chan)	8/2	1/2	6/2
synthesis type(s)	sample playback, waveshaping, osc sync	analog, osc sync	analog, osc sync	analog
programmable	yes; RT sys-ex	yes; RT sys-ex	yes	requires external device
voice filter type	resonant low/ band/hi/notch, 12/24dB/oct, mult filt in series	resonant lowpass	resonant lowpass, 12 or 24dB/oct	resonant lowpass
# of envs, filter env time/level params	3; 8 time, 7 level	3; 6 time, ??? level	1; 5 time, 1 level	3-1/2; 4 time, 2 level
# of LFOs/# of waveforms	2, 1 global; 26wf, RT mod, sync, 0-24Hz	2; 8wf, RT mod	2; 3wf, RT mod, ext sync, 0.15–20Hz	2 (plus global vibrato); 7wf, RT mod
output routing per oscillator	set & dyn pan, send	dyn pan	—	—
modulation routings	40 x 36 matrix, 125 src, 40 dest	10 x 10 matrix, 24 src, 33 dest	pulse width mod	10 x 10 matrix; 20 src, 32 dest
drum kits	11 ROM, up to 1,000 RAM; 128-key layout, full tune range; 32 layer, filt, env, pan/send	—	—	—
memory	8Mb; single: 200 ROM, 1,000 RAM; multi: 100 ROM, 1,000 RAM	single: 200 ROM, 200 RAM; multi: 50 RAM	40 ROM, 60 RAM	single: 800 ROM, 200 RAM
memory expansion	up to 128Mb sample RAM, two 8Mb ROM wave/patch blocks, one 4Mb block, 1.25Mb P-RAM	no	no	no
tuning tables	17 ROM, 255 RAM; 12 keys, full range	4 RAM, 128 keys, full range	—	none
# of multi parts/output routings in multis/other multi features	16/out, FX; remap	16; remap	—	not multitimbral; 6-chan MIDI guitar mode
sequencer	32 trax, 1 ch/trk, 255 patterns, 255 songs, 30,000 notes (60,000 events), 768 ppq, swing, ee, bbc, SMF, MC/SPP	none	none	none
# of simul FX/# of FX processors; # of alg, real-time control	4/1, 27 alg, RT mod	programmable graphic EQ	none	none
other features	trigger seq from kbd, multisample layout remap, dual SCSI, upgrade to full-function sampler	MSR: optional board adds 8 more voices; external audio inputs processed by EQ & mix; Prosynth: ext outputs kit: $100	MIDI overflow mode for polyphony	legato/unison mode; up to 6 units can rotate voices
dimensions (inches), weight	K2500: 47-3/4 x 17-3/4 x 4-3/4, 55-1/2 lbs; K2500X: 54-3/8 x 17-3/4 x 4-3/4, 72 lbs; K2500R: 17 x 14 x 5, 30 lbs	19 x 13-1/2 x 1-3/4, 9 lbs	19 x 3-7/8 x 1-3/4, 1-1/2 lbs	1U, 9-1/4 lbs
suggested retail price(s)	K2500: ???; K2500X: ???; K2500R: $3,495; sampling upgrade: $695; battery-backed P-RAM: $395, 8Mb wave blocks: $395; 4Mb pno: $250	Prosynth: $1,149; MSR-2: $1,695, 8-voice exp board: $695	$649.95	$799
Keyboard Report date:	—	MSR: Feb. '95	Bass Station: Feb. '95	Sept. '88

Oberheim OB-Mx	Peavey Spectrum Bass	Peavey Spectrum Synth	Peavey CyberBass	Peavey DPM si
1.04	1.1	1.0	???	1.7
2 x 40 backlit LCD, graphic	none	3-digit LED	2 x 20 backlit LCD	2 x 40 backlit LCD
14 (12 mono, L/R stereo), hdphon	2	2	6	4, hdphon
no	no	no	no	no
none	none	none	none	76-key synth, 4 zones
V, CA	V, CA	V, CA	V, CA	V, CA
—	—	—	—	PB, mod, programmable slider
none	none	none	none	dual ftsw
—	31.25kHz	41.67kHz	???	???
base unit 2, expanded 12; 2 osc per pgm	8/4	12/4	16/4	32/4
analog w/ FM & osc sync	sample playback	sample playback, osc sync	sample playback	sample playback
yes; RT sys-ex	partially programmable	yes	yes	yes; RT sys-ex
12dB low/hi/band, 24dB low (in parallel); res	resonant lowpass	resonant low/band/hi (2/4-pole low)	resonant lowpass	resonant lowpass
4; 7 time, 2 level	2; 4 time, 4 rate	3; 6 time	4; 4 time, 4 rate	2; 4 time, 4 level
3; 5wf, RT mod, .01–30Hz	1; 5wf, RT mod	2; 5wf, RT mod	2; 5wf, RT mod	1; 5wf, RT mod
set & dyn pan	dyn pan	dyn pan	set pan, send	set & dyn pan, send
12 x 12 matrix; 20 src, 28 dest	—	30 x 36 matrix, 30 src, 30 dest	8 x 6 matrix, 15 src, 6 dest	14 x 15 matrix, 14 src, 15 dest
—	—	—	10 RAM, 32 keys, layer, att/dec, pan/send, ±24 semitons	10 RAM, 32 keys, filt, decay, pan, ±36 semitones
single: 128 ROM, 128 RAM; multi: 128 ROM, 128 RAM	1Mb; single: 200 ROM; multi: 200 ROM	2Mb; single: 192 ROM, 64 RAM; multi: 192 ROM, 64 RAM	11Mb; single: 200 RAM; multi: 200 RAM	10Mb; single: 200 ROM, 200 RAM; multi: 200 ROM, 200 RAM
none	none	none	prog card slot; optional 1Mb sample RAM	prog card slot
10 ROM, 9 RAM, 128 keys ±100 cents	none	none	none	4 ROM, 2 RAM, 12 keys, ±1 semitone
up to 6 w/ expanded unit; voice reserve (not dynamic allocation)	4; overflow	4; overflow	16/out, FX; overflow, remap	16/out, FX; overflow, remap
none	none	none	none	16 trax, 1 ch/trk, 50 patterns, 10 songs, 80,000 notes, 96 ppq, ee, bbc, MC/SPP
none	none	none	4/4, 40 alg	2/2, 10 alg, RT mod
legato, mono, rotate, repeat, & stack assign modes	—	editor software runs on optional PC 1600 slider box	—	—
5U high, 7" deep, 18-1/2 lbs	???	???	???	???
$2,995 base unit, $879 per 2-voice expansion board	$299.99	$399.99 PC 1600: $349.99	$999.99	$1,699.99
Aug. '94	May '93	—	—	Aug. '93

Manufacturer contact list on page 162

Synths/Tone Modules

	Peavey DPM 4, DPM 488	Roland SC-50, SC-55mkII	Roland SC-88, M-GS64	Roland JV-880
current operating system	???	???	???	???
display	2 x 40 backlit LCD	5 x 19 backlit LCD, graphic	SC: 70.6 x 24.5mm backlit LCD, graphic; M-GS: 3 LEDs	2 x 24 fluoresc, graphic
audio outputs	2, hdphon	2, mini hdphon	SC: 2, mini hdphon; M-GS: 4, hdphon	4, hdphon
disk drive	DD	no	no	no
keyboard	4: 61-key synth, 4 zones; 488: 88-key weighted	none	none	none
key response	V, CA	V, CA, PA	V, CA, PA	V, RV, CA
Left-hand controllers	PB, mod	—	—	—
rear-panel control inputs	stereo ftsw, mono ftsw, CV pedal	none	none	none
playback clock rate	38.5kHz	44.1kHz	44.1kHz	44.1kHz
max polyphony/# of voices per prog	32/2 (4-way link mode programs, 2 voices each)	28/2	64/2	28/4
synthesis type(s)	sample playback	sample playback	sample playback	sample playback, fixed freq modulation
programmable	yes; RT sys-ex	multi offsets only; sys-ex	yes; sys-ex, offsets in multis	yes; sys-ex
voice filter type	resonant lowpass	resonant lowpass	resonant lowpass	resonant low/hi
# of envs, filter env time/level params	4; 4 time, 4 level	1; 3 time	1; 3 time	3; 4 time, 4 level
# of LFOs/# of waveforms	2; 5wf, RT mod	2; 1wf, RT mod	2; 1wf, RT mod	2; 6wf, RT mod
output routing per oscillator	set pan, send	dyn pan	dyn pan	set & dyn pan, send
modulation routings	8 x 6 matrix, 15 src, 6 dest	6 src, 11 dest	6 src, 11 dest	3 src, 12 dest
drum kits	100 RAM, 32 keys, layer, filt, att/dec, pan/send, ±24 semitones	9 ROM; indiv drum pan, send, tune ±24 semitones	22 ROM, 2 RAM; 85 keys, pan/send, ±24 semitones	2 ROM, 1 RAM; 61 keys, filt, full env, pan/send, ±48 semitones
memory	512Kb sample RAM, 10Mb wave ROM; single: 100 RAM; multi: 100 RAM	??? wave ROM; single: 354 ROM (SC-55), 226 ROM (SC-50) incl GM	8Mb; single: 654 ROM (incl GM), 256 RAM	4Mb; single: 128 ROM, 64 RAM; multi: 32 ROM, 16 RAM
memory expansion	512K added sample RAM; DPM 4 only: prog card slot	no	no	compat w/ SR-JV80 wave/patch boards
tuning tables	3 ROM, 2 RAM, 12 keys, ±1 semitone	32 RAM tables, 12 keys per table, ±1 semitone	32 RAM tables, 12 keys per table, ±1 semitone	7 RAM tables, 12 keys per table, ±1 semitone
# of multi parts/output routings in multis/other multi features	16; overflow, remap	16/FX; voice reserve	32/FX; voice reserve	8/out; voice reserve
sequencer	9 trax, 1 ch/trk, 50 patterns, 10 songs, 20,000 notes, 96 ppq, bbc, MC/SPP	none	none	none
# of simul FX/# of FX processors; # of alg, real-time control	4/4, 40 alg	2/1, 4 alg, RT mod	3/1, 10 alg, RT mod	2/2, 21 alg
other features	compatible w/ DPM SX sample capture module	serial computer interface; audio input to mix out; SC-55 only: remote control	audio input to mix out; SC-88 only: serial computer interface	—
dimensions (inches), weight	???	9-7/8 x 8-5/8 x 2, 3-1/8 lbs	SC: 9-7/8 x 8-5/8 x 2-7/8, 5-3/4 lbs; M-GS: 1U rack, 5-7/8 lbs	1U rack, 9-1/4 lbs
suggested retail price(s)	DPM 4: $2299.99; DPM 488: $2,799.99; 512K sample RAM: $???	SC-50: $695; SC-55mkII: $895	M-GS: $895; SC: $1,195	$895
Keyboard Report date:	—	SC-55: June '92	—	JV-80: May '92

Roland XP-10	Roland JV-35, JV-50	Roland XP-50, JV-1080	Roland JV-90	Studio Electronics ATC-1
???	???	???	???	1.0
2 x 16 LCD	2 x 16 fluorescent	2 x 40, graphic LCD; XP: backlit LCD; JV: fluorescent	2 x 40 fluorescent	3-digit LED
2, hdphon	2, hdphon	XP: 2; JV: 6; hdphon	4 (2 for JV sounds, 2 for VE board), hdphon	1
no	JV-50 only: DD	XP only: HD	no	no
61-key synth, 2 zones	61-key synth, 2 zones	XP only: 61-key synth	76-key synth, 8 zones	none
V; 2 zones	V	V, RV, CA; XP: 16 zones; JV: PA response	V, RV, CA	V, CA
PB, mod, 2 assignable sliders assignable sweep/switch	PB, mod, 3 sliders	XP only: PB, mod, 2 sliders	PB/mod lever, presence slider, assignable slider	—
	sustain	XP only: sustain, 2 prog sweep	sustain, 2 assignable ftsw/sweep	gate in/out, CV in/out
44.1kHz	44.1kHz	44.1kHz	44.1kHz	—
28/2	28/2	64/4	28/4 (56/4 w/ expan board)	1/2
sample playback	sample playback	sample playback, wave modulation	sample playback, fixed freq modulation	analog (transistors), osc sync, audio rate FM
yes; sys-ex, offsets in multis	yes; sys-ex, offsets in multis	yes; RT sys-ex	yes	yes; RT sys-ex
resonant lowpass	resonant lowpass	low/band/hi/peak, resonant	resonant low/hi	resonant lowpass, 12 or 24dB/oct
1; 3 time	1; 3 time	3; 4 time, 4 level	3; 4 time, 4 rate	3; 4 time, 1 level
1; 1wf, RT mod	1; 1wf, RT mod	2; 8wf, RT mod, sync to MIDI clock	2; 6wf, RT mod	2 (shared); 6wf, RT mod, sync to MIDI clock
dyn pan	dyn pan	set & dyn pan, send	set & dyn pan, send	—
6 x 11	6 src, 11 dest	3 x 48 matrix; 13 src, 18 dest	3 x 48 matrix, 3 src, 12 dest	standard (incl PW mod, FM, noise level)
16 ROM, 20 RAM; 61 keys, filt, A/D env, pan, send, ±24 semitones	9 ROM, 9 RAM; 68 keys, pan/send, ±24 semitones	8 ROM, 2 RAM; 64 keys, filt, full env, pan/send, ±48 semitones	4 ROM, 1 RAM; 76 keys, filt, full env, pan/send, ±48 semitones	—
8Mb; single: 338 ROM (incl GM), 256 RAM; multi: 64 ROM, 64 RAM	4Mb; single: 226 ROM (incl GM), 256 RAM; multi: 8 RAM	8Mb; single: 512 ROM (incl GM), 128 RAM; multi: 64 ROM, 32 RAM	4Mb; single: 256 ROM, 64 RAM; multi: 64 ROM, 16 RAM	512 RAM
no	VE series wave/patch/voice boards	up to 4 user-installable expansion boards	prog card slot; VE series voice exp, SR-JV80 series wave exp	no
1 RAM table, 12 keys, ±1 semitone	16 RAM tables, 12 keys per table, ±1 semitone	16 RAM tables, 12 keys per table, ±1 semitone	7 RAM tables, 12 keys per table, ±1 semitone	—
16/FX; voice reserve	16/FX; voice reserve	16/FX; voice reserve; JV only: out	8 (exp to 24);	—
none	JV-50 only: 1 track, 16 ch, 0 songs (direct to disk record), 90,000 notes, 96 ppq, chase, SMF, MC/SPP	XP only: 16 trax, 16 ch/trk, 100 patterns, 1 song, 20,000 notes, 96 ppq, ee, bbc, chase, SMF, MC/SPP	voice reserve	none
2/2, 16 alg	2/1, 4 alg, RT mod	4/3, 49 alg, RT (2 inputs)	none	none
real-time Xfades; programmable arpegg w/ MIDI sync	music minus one, solo/portamento control	XP only: seq plays direct from floppy; trigger phrases from one key; groove quantize	2/2, 21 alg	audio in, 16-bit ctrlr data, alternate filter cartridges (Moog, ARP, Roland, Oberheim)
40-3/4 x 11-3/4 x 3-3/4, 11-1/2 lbs	39-3/4 x 11-1/2 x 3-1/2; JV-50: 14-1/2 lbs; JV-35: 13-3/4 lbs	XP: 40-1/4 x 13-3/4 x 3-7/8, 20-1/2 lbs; JV: 2U rack, 11" deep, 11 lbs	47-1/4 x 12 x 3-3/8, 21-3/4 lbs	17 x 10 x 3-1/2, 7 lbs
$895	JV-35: $1,395; JV-50: $1,695; VE series exp boards: $475	JV: $1,895; XP: $2,195; SR-JV80 expan wave/ patch boards: $475 each	$2,050; VE & JV expansion boards: $475	$895; multi filter cartridge holder: $149, filter cartridges: $75
—	—	XP: Oct. '95	—	—

Manufacturer contact list on page 162

	Studio Electronics SE-1, SE-6	Technics SX-WSA1, SX-WSA1R	Yamaha MU5	Yamaha MU80, MU50	Yamaha QS300
current operating system	SE-1: 2.2; SE-6: 1.0	???	???	???	1.0
display	4 x 28 backlit LCD	320 x 240 pixel backlit, graphic	1 x 16 LCD, graphic	4 x 18 backlit LCD, graphic	64 x 240 pixel backlit, graphic
audio outputs	SE-1: 1; SE-6: 8	4, hdphon	2 (mini stereo), mini hdphon	2, mini hdphon	2, hdphon
disk drive	no	HD	no	no	HD
keyboard	none	61-key synth, 8 zones	25-key button layout	none	61-key synth
key response	V, CA; SE-6 only: PA	V, RV, CA	none	—	V, CA
Left-hand controllers	—	PB, 2 mod, 2 trackballs	none	none	PB, mod
rear-panel control inputs	none	2 ftsw, 1 assignable sweep	none	none	sustain, volume, foot controller
playback clock rate	—	???	???	???	???
max polyphony/# of voices per prog	SE-1: 1/3; SE-6: 6/3	64/4	28/2	64/2 (up to 4-patch layer per MIDI chan)	32/4
synthesis type(s)	analog (transistors), osc sync, ring mod, noise	acoustic modeling	sample playback	sample playback	sample playback
programmable	yes; SE-6 only: RT sys-ex	yes; sys-ex	no	in multi parts only	yes; RT sys-ex (offsets in multis)
voice filter type	resonant lowpass, 12 or 24dB/oct	resonant low/hi	none	resonant lowpass	resonant lowpass
# of envs, filter env time/level params	4; SE-1: 3 time, 1 level; SE-6: 5 time, 2 level	3; 4 time, 5 level	1	2; 5 time, 2 level	3; 4 time, 5 level
# of LFOs/# of waveforms	3; 6wf, RT mod, .5–50Hz	6 (12 per 4-osc patch); 4wf, RT mod	1; 1wf	2; 1wf; 0-50Hz	12; 3wf, 0-39.7Hz
output routing per oscillator	—	set & dyn pan	dyn pan	dyn pan	set & dyn pan
modulation routings	standard; SE-6: PW mod, res mod	standard	LFO only	3 x 3; any MIDI ctrlr	standard
drum kits	—	8 ROM, 4 RAM, 61 keys, layer, filt, env, pan/FX, ±60 semitones	8 ROM	21 ROM, 4 RAM; 79 keys, filt, env (ADR), pan/send, ±64 semitones	22 ROM, 1 RAM; 61 keys, filt, env, pan/send, ±64 semitones
memory	SE-1: 198 RAM; SE-6: 256 RAM single, 128 RAM multi	single: 256 ROM, 256 RAM; multi: 128 ROM, 128 RAM	??? wave ROM; single: 128 ROM (GM)	MU80: 8Mb wave ROM; MU50: 4Mb wave ROM; single: 729 ROM (MU80), 737 ROM (MU50); multi: 64 ROM, 128 RAM	4Mb; single: 707 ROM (incl GM) sing/dual elem voices, 128 4-elem ROM voices, 128 RAM (4-elem); multi: 10 RAM
memory expansion	no	SY-EW1 wave expansion board	no	no	no
tuning tables	—	20 ROM, 1 RAM; 12 keys, ±1 semitone	none	1 RAM, 12 keys, ±1/2 semitone	none
# of multi parts/output routings in multis/other multi features	SE-6 only: voice reserve, overflow	32/out, FX; remap	16	MU80: 32/FX; MU50: 16/FX	16/FX
sequencer	none	WSA1: 16 trax, 1 ch/trk, 10 songs, 47,000 notes, 96ppq, SMF, MC, play from floppy, piano roll edit; WSA1R: SMF playback only	none	none	24 trax, 1 ch/trk, 800 patterns, 10 songs, 86,000 notes, 96 ppq, ee, swing, SMF, MC/SPP
# of simul FX/# of FX processors; # of alg, real-time control	none	10/4, 55 alg, RT mod	none	MU80: 4/4, 69 alg; MU50: 3/3, 64 alg; RT mod	3/3, 64 alg, RT mod
other features	exponential envelopes, env invert, auto glide	SY-ES1 output expander (1 S/PDIF, 4 line out); instant ctrlr reassign for perform	external power adapter or 6 AA batteries	MU80: stereo audio in to FX; MU50: stereo audio in to mix out; XG-compatible	XG compatible, real-time swing quant & gate/vel offset
dimensions (inches) weight	SE-1: 12 x 8 x 5-1/4, 10 lbs; SE-6: 17 x 12 x 7, 16 lbs	WSA1: 41-1/2 x 13-7/8 x 4-1/2, 28-3/4 lbs; WSA1R: 3U rack	7-3/8 x 4-1/8 x 1-1/4, 3/4 lb	8-5/8 x 8-1/4 x 1-3/4, 2-3/4 lbs	42 x 14-5/8 x 4-3/4, 28-5/8 lbs
suggested retail price(s)	SE-1: $1,495, ext audio in: $25; SE-6: $4,495	SX-WSA1R: $2,995; SX-WSA1: $3,395	$299.95	MU50: $595; MU80: $895; computer cable: $11.95 (Mac), $33.95 (PC)	$1,895
Keyboard Report date:	Apr. '94	—	July '95	Aug. '95	—

Yamaha QY22	Yamaha QY300	Yamaha W7, W5	Yamaha SY99	Yamaha VL1, VL7, VL1m
???	1.9	1.4	???	???
64 x 128 pixel, graphic	64 x 240 pixel LCD, graphic	64 x 240 pixel backlit LCD, graphic	64 x 240 pixel backlit LCD, graphic	64 x 240 pixel LCD, graphic
stereo mini, mini hdphon	2, hdphon	2, hdphon	4, hdphon	2, hdphon
no	DD	DD	DD	HD
25 buttons	26 buttons	W7: 61-key synth; W5: 76-key synth; 4 zones	76-key synth, 4 zones	VL1, VL7: 49-key synth; VL1 only: 2 zones
V response, CA record in sequencer	V response, CA record in sequencer	V, CA	V, CA	V, CA
—	—	PB, mod, programmable slider	PB, 2 mod wheels	VL1, VL7: PB, 2 mod wheels
none	none	sustain, volume, programmable sweep	sustain, prog switch, volume, prog sweep, breath	VL1, VL7: 2 ftsw, 2 sweep, breath
???	???	up to 50kHz	50kHz	???
28/2	28/2	32/4	32 (16 sample playback, 16 FM) /4	VL1, VL1m: 2/2; VL7: 1/1
sample playback	sample playback	sample playback	sample playback, FM, sample modulation	physical modeling
no	no	yes; RT sys-ex	yes; RT sys-ex	yes; RT sys-ex
—	—	resonant low/high/band/notch	resonant low/hi, 12-24dB/oct	resonant low/high/band/notch
—	—	2; 4 time, 4 level	3; 6 time, 6 level, looping	4; 4 time, 2 level
—	—	1; 6wf, RT mod	2; 6wf	2; 1wf, RT mod, 0Hz–audio rate
—	—	set & dyn pan	set & dyn pan, send	set & dyn pan
mod wheel MIDI input to LFO	mod wheel MIDI input to LFO	7 x 3 matrix, 3 src, 29 dest	3 x 6 matrix, 8 src, 5 dest	8 x 14 matrix, 124 src, 14 dest
8 ROM	10 ROM	10 ROM, 2 RAM; W7: 61 keys; W5: 76 keys; decay, pan/send, ±63 semitones	3 ROM, 64 RAM; 76 keys, pan/send, –48/+36 semitones	none
2Mb; single: 128 ROM (GM); multi: 20 RAM; 100 ROM patt (6 sect each), 100 RAM patt	4Mb; single: 128 ROM (GM); multi: 10 RAM; 100 ROM patt (6 sect each), 100 RAM patt	8Mb; single: 256 ROM, 128 RAM; multi: 16 RAM	8Mb wave ROM, 512Kb wave RAM; single: 128 ROM, 64 RAM; multi: 16 ROM, 16 RAM	single: 128 RAM
no	no	wave card slot, 4Mb internal wave option	prog & wave card slots, up to 3Mb wave RAM	no
none	none	none	64 ROM, 2 RAM; 128 keys, full range	54 ROM, 2 RAM, 128 keys, ±70 cents
8	24/FX	16/FX	16/out, FX	—
8 trax (4 linear, 4 pattern), 1 ch/trk, 20 songs, 100 patterns, 100 phrases, 28,000 notes, 96 ppq	24 trax (16 linear, 8 pattern), 1 ch/trk, 10 songs, 100 patterns, 100 phrases, 53,000 notes, 96 ppq, ee, swing, SMF, MC/SPP	16 trax, 1 ch/trk, 16 songs, 100,000 notes, 96 ppq, ee, SMF, MC/SPP	16 trax, 1 ch/trk, 99 patterns, 10 songs, 27,000 notes, 96 ppq, ee, SMF, MC/SPP	none
none	1/1, 8 alg, RT depth mod	10/6, 75 alg, RT mod	4/2, 63 alg, RT mod	3/3, 14 alg, RT mod
8-track user patterns	8-track user patterns	template-based voice prgming, graphic mixer in LCD; free Mac ed/lib software	receive/send MIDI sample dump	—
7-3/8 x 4-1/8 x 1-1/2, 3/4 lb	13-1/2 x 9-3/8 x 2-1/2, 4-5/8 lbs	W7: 42-1/2 x 14-5/8 x 4-3/4, 30 lbs; W5: 50-3/4 x 14-5/8 x 4-3/4, 39 lbs	49-3/8 x 16 x 4-3/8, 43-1/4 lbs	36 x 14-7/8 x 4-1/8, 27-1/2 lbs
$595	$995	W7: $1,995; W5: $2,495; exp wave boards: $149.95	$3,995	VL7: $2,995; VL1: $4,995; VL1m: $2,995; BC2 breath ctrlr: $75.95
—	June '95	Mar. '95	Jan. '92	June '94

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etc.) available for an LFO. "RT mod" refers to real-time modulation of LFO *rate* (not depth, which all synthesizers have, or should). We asked manufacturers to give us the frequency range of their LFOs; not all of them provided the information, however.

Output Routing per Oscillator. This category describes the ability to set the various oscillators in a patch to their own pan position (set pan), to dynamically pan individual oscillators under either real-time input or LFO control (dyn pan), and to give each oscillator in a multi-osc patch its own effects send level (send).

Modulation Routings. This poorly defined lump of information is intended to give you at least some idea of how powerful the modulation routings of the instrument are. We asked questions about "matrix modulation," but some instruments have dedicated matrix mod pages that allow any input to be assigned to any destination, while others may have even more powerful modulation possibilities but provide inputs on separate module pages (pitch, filter, etc.) rather than on a matrix page. "Matrix" figures are given for some of the latter instruments in the chart; what the figures mean, in this case, is somewhat arbitrary. The source and destination numbers, if present, may help you compare apples with apples and oranges with oranges.

The word "standard" means that an instrument can route LFO to pitch and probably filter, has envelope inputs to filter and amplitude, routes mod wheel to LFO depth in some manner, and a few other things like that.

Drum Kits. We attempted to ascertain whether individual keys within a drum kit can be given their own filter settings, envelope (noted as "decay" or "att/dec," for instance, depending on the type of envelope parameters provided), pan position, effects send level, and multi-drum-sound layering, as well as the number of keys in the kit and the overall tuning range of each drum sample.

Memory. The first figure given is usually the number of Megabytes of waveform ROM; single patches and multi-type patches are listed separately.

Number of Multi Parts. This grab bag category describes at least one thing unambiguously: the number of "parts" (usually equivalent to MIDI channel reception slots) that are simultaneously available. In addition, we tried to find out whether each part could be given its own pan position and/or output jack assignment ("out") and/or effects send level ("FX"). Instruments that offer a voice reserve for each part, patch program parameter offsets within the multi parts, MIDI program change remapping, or an "overflow" mode (in which MIDI notes that can't be responded to because the instrument is busy are routed to the MIDI output, so they can be sounded by a second unit) are also noted.

The question of what constitutes a "multi" is not entirely clear. Some instruments have three levels of architecture rather than two: a single-patch mode, a combi mode in which four or eight patches are zoned or layered on the keyboard, and a 16-channel MIDI multi. Others may not have "combi" presets in this sense, but they allow you to link and keyboard-zone three or four additional patches within a single patch. How do they fit into our chart? Badly.

Sequencer. Most of the facts in this category should be obvious. "ee" refers to a screen or utility in which single events can be edited, "bbc" refers to the ability to define edit regions with bar/beat/clock precision (as opposed to bar-line-only regions) for block edits such as velocity scaling and transposition, "MC/SPP" refers to the ability to sync to MIDI clocks with MIDI Song Position Pointer, and "SMF" refers to the ability to load Standard MIDI Files from an MS-DOS diskette.

Number of Effects. The first two numbers in this category (such as "4/2") show (a) how many simultaneous effects the unit is capable of when each effect process in a multi-effect algorithm such as distortion/delay is counted separately, followed by (b) how many simultaneous effects the unit is capable of when each multi-effect algorithm is counted as only *one* effect. The latter number quite likely bears some resemblance to the number of discrete effects processors that the hardware boasts. For instance, if you have only one processor, but one of its algorithms is chorus/delay/EQ, the entry should read "3/1." The next number refers to the total number of algorithms that can be selected. Real-time modulation capability is also noted. ■

◄ Continued from page 8

Voce V3 that came out the winner with 31.5 points, while the XB-2 scored 30.6 points. As I said, the tests were fair; I just want to see credit given where it's due.

Andy Burton
via Internet

Darn that Dream

In the article "Near-Field of Dreams" [Oct. '95] *Keyboard* notes that Yamaha NS10M Studio speakers are "considered by many to be an industry standard," and clearly *Keyboard* demonstrates this by their choice of the NS10M Studio as the standard against which all of the other systems are judged. Of course we recognize that it is the mission of our competitors to try to unseat the NS10M Studio as the top choice near-field. I am disappointed, however, by *Keyboard's* back-handed comments about the NS10Ms, specifically, "Although the NS10Ms seem to have taken a beating in this comparison," and "We don't mean to convey that the NS10Ms sound bad." This negative tone seems to indicate that *Keyboard* is a participant in that mission. Why does *Keyboard* feel obligated to adopt such a negative tone, instead of balancing its write-up with reasons why these speakers have been so successful over the years?

Of particular concern to us is the statement, "We will say, though, that at the end of an extended session of listening only to them, our ears were pretty tired." As you must be aware, thousands of engineers rely on NS10Ms day after day as their reference monitor. We have yet to hear from any of them that their ears get tired as a result of mixing with NS10Ms.

The NS10M Studio can be found in most major recording studios world-wide. In fact, there are more NS10Ms in service than all of our competitors' speakers combined. Why? Simply put, the NS10Ms provide a unique combination of response accuracy and ability to handle power at the high listening levels common in music production. What's more, they are affordable. All of the other systems reviewed, with the exception of the Alesis systems, cost two to five times as much as the NS10M Studio.

The use of the word "pleasant" with regard to reference monitor performance should not be taken as a compliment. Another set of monitors may sound magnificent. Unfortunately, that is not the point of a good reference monitor. By design, NS10Ms do not necessarily sound magnificent. Yet top engineers continue to trust the NS10M Studio to provide an accurate representation of what is really going to tape. It is important to these professionals that what sounds good in the studio sound great in the real world — on home systems, in theaters, and on the radio.

Billions of dollars have been made from mixes that were referenced on the Yamaha NS10M Studio monitors. Hundreds of thousands of mixes, including the majority of mixes on the *Billboard* weekly Top Ten, speak for themselves. Quite honestly, we believe that if we even considered messing with the sound of these speakers, we would witness a major lynch mob forming in front of our headquarters, consisting of the many audio professionals whose careers depend on what they hear through Yamaha NS10Ms.

Peter Chaikin
Product Manager, Recording Products
Yamaha Corporation of America

More Whiner Nausea

I'm sick of whiners like Bill Roberts [Letters, Sept. '95] complaining about government funding for the National Endowment for the Arts. The paltry sum the NEA receives from our tax dollars doesn't even equal what the military spends on its stage bands! Tell ya what, folks: I'll gladly pay for Bill's share of the NEA when Bill pays for my share of the military budget.

Joel B. Horwitz
Portland, OR

Continued on page 64 ►

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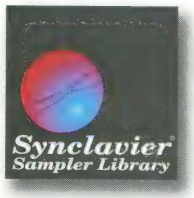

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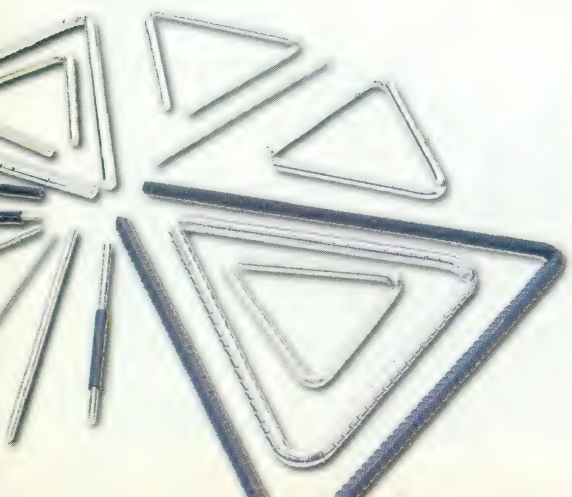

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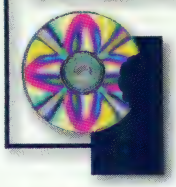

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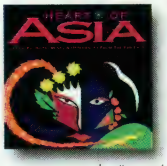

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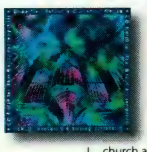

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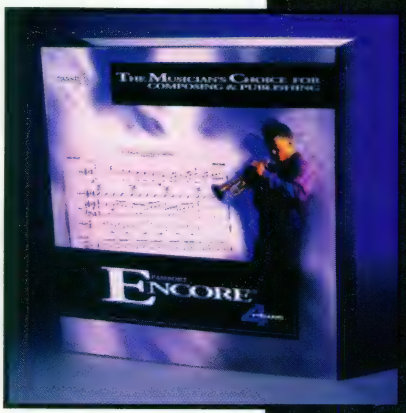
Julian Bratolyubov is the music supervisor for MCA/Universal. His credits include "Casper", "Apollo 13", "Waterworld", "Delores Clairborne" and television shows such as "Murder She Wrote".



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CIRCLE READER SERVICE # 123

BUYER'S GUIDE

Samplers

BIG DAC ATTACK

BY **GREG RULE**

It's hard to imagine an electronic music world devoid of samplers. Since their inception, samplers have redefined the way many of us make music. Whether they're used for rhythm loops, sound effects, acoustic instrument simulations, or whatever, samplers have become the cornerstone of many a production studio and stage show.

Samplers have evolved steadily — the current crop being proof positive. Priced from rock-bottom to "oh my God," samplers come in many shapes and sizes, as you'll see in the following chart.

What you won't find here, however, are samplers that rely on computers — Digidesign's SampleCell, for example. These were excluded in order for us to stay true to our "no computers" buyer's guide theme. Also excluded were sample playback units that lack audio inputs.

Before you dive into the chart, please take time to read the following abbreviations and explanations for categories that might be confusing.

Bit Resolution. This important spec has four parts: input, internal word size, individual output, and stereo mix outs. The internal resolution refers to audio processing (such as on-board DSP) that requires extra arithmetic headroom. An output resolution greater than 16 bits helps to produce greater fidelity, even when the sample words are only 16 bits.

Number of DACs. A DAC (digital-to-analog converter) is where the sampler's digital sound is translated into a signal that can be plugged into a standard audio mixer. Some samplers provide a separate DAC for each output jack. In others, a single DAC runs at a high enough speed to multiplex — that is, it can handle several analog outputs at once. Other things being equal, the more DACs a sampler has, the better it will sound when multiple outputs are used.

Loops. This category specifies the maximum number of loops that can be programmed into an individual sample, and also the type(s) of loops that can be programmed. Samplers that allow two loops per sample typically use the first loop for sustaining a note, and proceed to the second loop (called a release loop) when the note-off message is received.

Number of Envelopes per Voice. This category seems simple at first glance, but some issues are difficult to explain in a chart. Some samplers provide both individual voice envelopes and "global" envelopes that will be applied to all of the currently sounding voices. As a result, if you're playing one note you may be able to use three envelopes, but with two notes you get only five envelopes, not six.

The number of envelope stages is also a potential point of confusion. A conventional ADSR envelope is sometimes thought of as a "four-stage" envelope — but if we consider that a single stage must contain settings for both rate and level, an ADSR has only one complete stage, the decay/sustain stage. It has two partial stages (attack and release, neither of which allows a level to be programmed).

CD-ROM Formats. In addition to the type of files a sampler will read (Akai, Roland, etc.) we've added three additional information bits to this category, represented by an a, b, or c. The "a" means it will read the raw samples, "b" indicates it will read the samples *and* key layouts, and "c" means it will additionally accept the pre-programmed voice parameters.

Non-realtime DSP utilities. As you peruse this category, please note that basic items — such as truncate, cut, copy, and paste — were excluded for brevity's sake.

ABBREVIATIONS

—: not applicable. **AES/EBU**: Audio Engineering Society/European Broadcast Union. **Amp**: amplitude. **Arch**: architecture. **Bal**: balanced. **Band**: bandpass. **CA**: channel aftertouch. **Chor**: chorus. **Comp**: compression. **Ctrl**: controller. **DD**: double density. **Dig**: digital. **Exp**: expansion. **Fwd**: forward. **HD**: high density. **Hi**: highpass. **Lo**: lowpass. **Mb**: megabyte. **Mod**: modulation. **Norm**: normalize. **PA**: polyphonic aftertouch. **Para**: parametric. **Pos**: positional. **PPQ**: pulses per quarter-note. **Prog**: programmable. **Q**: resonance. **Quant**: quantize. **Rev**: reverse. **S/PDIF**: Sony/Philips Digital Interface Format. **SCSI**: Small Computer Systems Interface. **SDS**: Sample Dump Standard. **SIMM**: Single In-line Memory Module. **SMDI**: SCSI Musical Data Interchange. **Sust**: sustain. **TBA**: to be announced. **Time comp/exp**: time compression and expansion. **Trax**: tracks. **TRS**: tip/ring/sleeve. **Unbal**: unbalanced. **V**: velocity. **X-fade**: crossfade. **X-switch**: cross-switch.

	Akai MPC3000	Akai S2000	Akai S3000XL	Akai S3200XL
list price base unit	$3,699	$1,195	$1,995	$3,995
current op system	3.08	1.02	1.06	1.05
audio ins	two 1/4"	two 1/4"	two 1/4"	two 1/4", two XLR
audio outs	ten 1/4" unbal, headphone	two 1/4" unbal, headphone	ten 1/4" unbal, headphone	two XLR, ten 1/4" unbal, headphone
digital I/O	S/PDIF (in only)	S/PDIF option	S/PDIF	AES/EBU, S/PDIF
computer I/O	SCSI	SCSI	SCSI	SCSI
disk drive(s)	HD floppy	HD floppy	HD floppy	HD floppy
RAM min/max	2Mb/16Mb	2Mb/32Mb	2Mb/32Mb	16Mb/32Mb
RAM expansion type	SIMMs + proprietary	SIMMs	SIMMs	SIMMs
LCD X char x Y line/graphic editing?	40 x 8/yes (mixer screen)	16 x 2/no	40 x 8/yes	40 x 8/yes
bit resolution (ADC/internal/DAC ind/DAC stereo)	16/28/18/18	16/28/18/18	16/28/18/18	16/28/18/20
# of DACs	10	1 (Multi 8/D option adds 4 DACs)	5	10
sample rates (kHz)	22.05, 44.1	22.05, 44.1	22.05, 44.1	22.05, 44.1
stereo sampling	yes	yes	yes	yes
max mono sample time at 44.1kHz, full memory	2:52.2	6:17.44	6:17.44	6:17.44
data transfer types	SDS	SDS, proprietary SCSI	SDS, proprietary SCSI	SDS, proprietary SCSI
CD-ROM formats	Akai S1000, S3000 (a)	Akai, E-mu EIII, Roland S-760 (b, c)	Akai, E-mu EIII, Roland S-760 (b, c)	Akai, E-mu EIII, Roland S-760 (b, c)
input monitoring	prior, during	prior, during	prior, during	prior, during
max polyphony	32	32	32	32
loop types/ # loops per sample	none (loop in sequencer)	sust w/ var time (reads all 4 from libraries, but can only program 1)/1	sust with var time/4	sust with var time /4
X-fade & switch types	V, slider	V, key pos, wheel, pan, pressure	V, key pos, mod wheel, pan, pressure	V, key pos, mod wheel, pan, pressure
filter types	low w/Q	low w/Q, more with SampleVerb card	low w/Q (hi & band w/Q, EQ option)	low/hi/band w/Q, EQ
envelopes per voice/segments per primary envelope	2/AD	2/one ADSR, one 4-stage	2/one ADSR, one 4-stage	3/one ADSR, two 4-stage
env destinations	amp, filter	amp, filter, pitch, pan mod, matrix mod	amp, filter, pitch, pan mod, matrix mod	amp, filter, pitch, pan mod, matrix mod
# of LFOs per voice/ # of LFO waves	none	2/4	2/4	2/4
non-realtime DSP	reverse, insert, silence section	norm, x-fade loop, time comp/exp, resample, reverse, fade	norm, x-fade loop, time stretch/comp, resample, EQ, rev, extract, mix, fade, silence, chop	norm, x-fade loop, time stretch/comp, resample, EQ, rev, extract, mix, fade, silence, chop
realtime effects	delay	w/optional SampleVerb card (4-ch multi FX proc: dist, EQ, ring mod, chor, flange, verb, and more)	w/optional SampleVerb card (4-ch multi FX proc: dist, EQ, ring mod, chor, flange, verb, and more)	w/optional SampleVerb card (4-ch multi FX proc: dist, EQ, ring mod, chor, flange, verb, and more)
keyboard	16 V/pressure-sensitive drum pads	—	—	—
MIDI response	V, ctrl (map to pitch, decay, filt, etc.)	V, CA, breath controller	V, CA, breath controller	V, CA, breath controller
sequencer features	99 trax, 96 ppq, 4 MIDI outs (64 ch), step edit, cut/paste, swing, tap tempo, change time sig, MTC, 2 mergable MIDI ins	—	—	—
optional add-ons	video display, 8Mb memory expander	Multi 8/D (adds 8 audio outputs & S/PDIF) $299, SampleVerb card $399	2nd LSI filter board $695, SampleVerb card $399, flash ROM $TBA	SampleVerb card $399, flash ROM $TBA
review date	—	—	Aug. '94 (S3000)	—
bundled sounds	4 disks	2 sound disks, 1 SMF disk	2 sound disks, 1 SMF disk	2 sound disks, 1 SMF disk
other features	SMPTE read/write, sync to MIDI clock/MTC/FSK24/qtr-note clicks, 2 sequences can play simult, 2 prog footswitches, reads MPC60 samples and programs	Mac graphic editing software free to registered owners, MIDI file player, legato mode	Mac graphic edit software free to registered owners, MIDI file player, legato mode, supports direct-to-disk recording, up to 16Mb flash ROM (for retaining samples in mem after power down)	Mac graphic editing software free to registered owners, MIDI file player, legato mode, suppotrs direct-to-disk recording, up to 16Mb of flash ROM (for retaining samples in mem after power down)

Clavia ddrum 3	E-mu ESI-32	E-mu e-64	E-mu EIV	Ensoniq ASR-10
$3,650	$1,495	$3,295	$5,995	$2,595 ($2,895 rack)
2.0	2.1	1.2	1.2	3.53
ten 1/4" trigger inputs	two 1/4" bal	two 1/4" bal	two 1/4" bal	two 1/4" unbal
eight 1/4", headphone	four 1/4", headphone	eight 1/4", headphone	eight 1/4" bal, two XLR, headphone	two 1/4" unbal, headph.
S/PDIF	S/PDIF option	AES/EBU	AES/EBU	S/PDIF
SCSI	SCSI option	SCSI	SCSI	SCSI option
—	HD floppy, internal SyQuest option	HD floppy	HD floppy	HD floppy
512Kb w/4Mb flash RAM/128Mb	2Mb/32Mb	2Mb/64Mb	8Mb/128Mb	2Mb/16Mb
PCMCIA	SIMMs	SIMMs	SIMMs	SIMMs
20 x 2/no	20 x 4/no	240 x 64 pixel/yes	240 x 64 pixel/yes	22 x 1/no
16/16/18/18	16/32/18/18	16/32/18/18	16/32/18/18	16/24/16/16
8	4	8	8	1 stereo for mix, 3 stereo for ind outs
44.1	22.05, 44.1	44.1, 48	44.1, 48	29.76, 44.1
no	yes	yes	yes	yes
25:00	6:34	13:04	26:08	3:03
SDS	SDS/SMDI	SDS/SMDI	SDS/SMDI	prop MIDI/SCSI
Akai, Sound Designer 1 (a)	Emax II, EIIIx, Akai (b, c)	Emax II, ESI-32, EIIIx, EIV, Akai (b, c)	Emax II, ESI-32, e-64, EIIIx, Akai (b, c)	Akai, Roland (b, c)
—	during	during	during	prior, during
16	32	64	128	31
1/fwd, dynamic start point	fwd/1	fwd/1	fwd/1	fwd, bi-directional, loop+release/1
V, pad position	V	128 layer V switch/fade	128 layer V switch/fade	V, key pos, LFO, wheels, pressure, pedal, envs 1 & 2
dynamic w/Q	low w/Q	17 types, incl 2/4/6-pole low w/Q, 2nd/4th hi w/Q, band w/Q, swept EQ, notch, morphing, phaser, flanger, bat-phaser	17 types incl 2/4/6-pole low w/Q, 2nd/4th hi w/Q, band w/Q, swept EQ, notch, morphing, phaser, flanger, bat-phaser	low/hi/band (Q with optional Waveboy software)
3/ADSR	3/AHDSR	3/six-stage	3/six-stage	3/AHDSR hard & soft envs
amp, pitch, EQ, gain	pitch, filter, amp, LFO, pan,	41 destinations incl amp, filter, LFO, pitch, glide, chorus, sample start/loop/trigger, ctrl amt	41 destinations, incl amp, filter, LFO, pitch, glide, chorus, sample start/loop/trigger, ctrl amt	pitch, filter, amp, pan, LFO depth/rate, loop position
—	1/4	2/4	2/4	1/7
norm, compression, dynamic para EQ	time comp/exp, taper, para EQ, comp, gain change, rev, pitch change, doppler/pan, stereo-to-mono, L/R swap, DC filter, rat conv, digital tuning, trans multiply	time comp/exp, taper, para EQ, comp, gain change, rev, pitch change, doppler/pan, stereo-to-mono, L/R swap, DC filter, rate conv, digital tuning, trans multiply, exciter	time comp/exp, taper, para EQ, comp, gain change, rev, pitch change, doppler/pan, stereo-to-mono, L/R swap, DC filter, rate conv, digital tuning, trans multiply, exciter	rev, time comp/exp, scale, fade, rate conv, smooth, splice
—	chorus (voice-based)	chorus (voice-based)	chorus (voice-based)	62 24-bit fx algorithms
—	—	—	—	61 synth
V	V, RV, CA	V, RV, CA	V, RV, CA	V, RV, CA, PA
—	—	—	—	16 trax, 96 ppq, event edit, 2 trax of sync dig audio via RAM or SCSI
Precision pad set $1,695, SCSI/DAT option $495, drum trigger set $445, tube trigger $125, remote kit changer $295	SCSI $250, SPDIF $200, 270Mb SyQuest model available	hard drive expandable up to 9Gb, 1/4" bal output kit $295, hard drive mounting kit $39.95	hard drive expandable up to 9Gb, MIDI card $199, 8 additional analog outs $TBA	ASR w/SCSI $2,995, SCSI $399.95, S/PDIF $399.95, 6-out expander $249.95
—	Aug. '95.	—	—	Aug. '94
4Mb ROM samples, 4Mb flash RAM samples	11 disks from E-mu lib, DSP disk	two CD-ROMs from E-mu library	two CD-ROMs from E-mu library	8 Essential sound disks
10 channels, trigger interface with position and pressure detection, each pad can have 8 position zones & 8 V zones	10 front-panel audition buttons, audio scrub, auto trunc/norm/placement, MIDI bank select, undo, load bank via MIDI, audition from disk	audio scrub, digital resamp, auto loop/trunc/norm/place, ACSII kbd interface, load while play, disk search & browse, aud from disk, op sys in flash RAM, 3 assgn keys, auto bank load, MIDI bank select, 9 V curves, undo	audio scrub, digital resamp, auto loop/trunc/norm/place, ACSII kbd interface, load while play, disk search & browse, aud from disk, op sys in flash RAM, 3 assgn keys, auto bank load, MIDI bank select, 9 V curves, undo	sample & resample through fx, prog pitch tables, 8 performance presets per bank

Manufacturer contact list on page 162

Samplers

	Ensoniq ASR-88	Kurzweil K2000S	Kurzweil K2500S	Peavey DPM SX II/ DPM SP
list price base unit	$4,495	$3,695 ($3,595 rack)	$TBA ($4,195 rack)	SX II: $399; SP: $999
current op system	3.53	3.18	1.0	SX II: 1.2, SP: 1.47
audio ins	two 1/4" unbal	one 1/4" TRS stereo unbal (plus two XLR in rack)	one 1/4" TRS stereo unbal (plus two XLR in rack)	SX II: two XLR, two 1/4" unbal
audio outs	two 1/4" unbal, headphone	four 1/4" (eight in rack), headphone	four 1/4" (eight in rack), headphone	SP: four 1/4" unbal, SX II: one 1/4" stereo TRS
digital I/O	S/PDIF option	AES/EBU, S/PDIF	AES/EBU, S/PDIF	—
computer I/O	SCSI	SCSI	SCSI	SX II: SCSI; SP: SCSI
disk drive(s)	HD floppy	HD floppy, hard disk option	HD floppy, hard disk option	SP: HD floppy, 80Mb internal hard drive option
RAM min/max	16Mb/16Mb	2Mb/64Mb	2Mb/128Mb	2Mb/32Mb
RAM expansion type	—	SIMMs	SIMMs	SIMMs
LCD X char x Y line/graphic editing?	22 x 1/no	240 x 64 pixel/yes	240 x 64 pixel/yes	SP: 20 x 2/no
bit resolution (ADC/internal/ DAC ind/DAC stereo)	16/24/16/16	16/prop/18/18	16/prop/18/18	16/16/—/16
# of DACs	1 stereo for mix, 3 st for ind outs	2 stereo (4 stereo rack)	4 stereo	2
sample rates (kHz)	29.76, 44.1	29.4, 32, 44.1, 48	29.4, 32, 44.1, 48	44.1
stereo sampling	yes	yes	yes	yes
max mono sample time at 44.1kHz, full memory	3:03	12:42	25:24	6:20
data transfer types	prop MIDI/SCSI	SDS, SMDI	SDS, SMDI	SDS, SMDI
CD-ROM formats	Akai, Roland (b, c)	Akai, Ensoniq, Roland (b, some c)	Akai, Ensoniq, Roland (b, some c)	—
input monitoring	prior, during	prior, during	prior, during	SX II: prior, during
max polyphony	31	24	48	16
loop types/ # loops per sample	fwd, bi-directional, loop+release/1	fwd, rev, bi-direct, alt start, exit loop on key up/1	fwd, rev, bi-direct, alt start, exit loop on key up/1	fwd/1
X-fade & switch types	V, key pos, LFO, wheels, pressure, pedal, envs 1 & 2	vel, any ctrl source	vel, any ctrl source	V, key pos, rand, wheel, chan & poly press, aux ctrls
filter types	low/hi/band (Q with optional Waveboy software)	low/hi/band/notch, para EQ w/sweepable Q, 12 & 24dB/oct res	low/hi/band/notch, para EQ w/sweepable Q, 12 & 24dB/oct res	low
envelopes per voice/ segments per primary envelope	3/AHDSR hard & soft envs	5/three 8-stage, 2 ASR	5/three 8-stage, 2 ASR	2/ASR
env destinations	pitch, filter, amp, pan, LFO depth/rate, loop position	matrix mod (any dest)	matrix mod (any dest)	amp, filter, pitch, pan
# of LFOs per voice/# of LFO waves	1/7	2/26	2/26	1/8
non-realtime DSP	rev, time comp/exp, scale, fade, rate conv, smooth, splice	time comp/exp, norm, auto trunc, vol adjst, clear, delete, rev, invert, insert zero, mix, insert, vol ramp, cres or decres, resample, pitch shift, mix beat, replicate, mix echo, beat vol adjust, x-fade looping	time comp/exp, norm, auto trunc, vol adjst, clear, delete, rev, invert, insert zero, mix, insert, vol ramp, cres or decres, resample, pitch shift, mix beat, replicate, mix echo, beat vol adjust, x-fade looping	stereo merge
realtime effects	62 24-bit fx algorithms	variable arch synthesis, multi FX processor	variable arch synthesis, multi FX processor	—
keyboard	88 weighted	61 synth, 3 zone	76 synth or 88 weighted, 8 zone	—
MIDI response	V, RV, CA, PA	V, RV, CA	V, RV, CA	V, CA
sequencer features	16 trax, 96 ppq, event edit, 2 trks of sync dig audio via RAM or SCSI	32 trax, 768 ppq, event edit, groove quant, key triggering	32 trax, 768 ppq, event edit, groove quant, key triggering	—
optional add-ons	S/PDIF $399.95, 6-out expander $249.95	Orch & Contemp 8Mb ROM exp $395 ea., ROM daughter board $125, RAM exp $395	prices of keyboard models TBA, 4 stereo bus effects option, dig multitrk interface, ADAT interface, Orch & Contemp ROM exp $395 each, ROM daughter board $250, RAM exp $395	—
review date	—	Aug. '94	—	Aug. '94
bundled sounds	8 Essential sound disks, 2 CD-ROMs	over 1,000 programs and samples on disk	over 1,000 programs and samples on disk	4 disks (2 piano, 1 drum, 1 nylon guitar)
other features	sample & resample through fx, prog pitch tables, 8 performance presets per bank	read/write AIFF, .WAV, and standard MIDI files; audition samples from disk; see synth chart, page 40	read/write AIFF, .WAV, and standard MIDI files; audition samples from disk, sample while you play; see synth chart, page 40	each unit occupies a single rack space

Peavey DPM SX II/ DPM SP Plus	Peavey DPM SX/ DPM 4/DPM 488	Roland MS-1	Roland JS-30	Roland S-760
SX II: $399; SP Plus: $1,299	SX: $349; DPM 4: $2,299; DPM 488: $2,799	$695	$1,795	$2,295
SX II: 1.2, SP Plus: 1.0	SX: 1.3; DPM 4: 1.02; 488: 1.03	1.10	1.00	2.20
SX II: two XLR, two 1/4" unbal	SX: one XLR, one 1/4" unbal	one 1/4" unbal, two RCA, 1 stereo TRS 1/8"	one XLR, two RCA	two 1/4" unbal
SP Plus: four 1/4" unbal, SX II: one 1/4" TRS stereo bal	DPM 4 & 488: two 1/4" unbal, headphone	two RCA, headphone	two RCA, headphone	four 1/4" unbal, 1/8" headphone
—	—	—	—	S/PDIF
SX II: SCSI; SP Plus: SCSI	SX: SCSI	—	SCSI	SCSI
HD floppy, 270Mb internal SyQuest option	DPM 4: DD floppy; DPM 488: DD floppy	—	—	HD floppy
2Mb/64Mb	512Kb/1Mb	384Kb/33Mb	1Mb/4Mb	2Mb/32Mb
SIMMs	proprietary	PCMCIA	SIMMs	SIMMs
SP: 20 x 2/no	DPM 4 & 488: 40 x 2/no	16 x 1/no	4 digit, 7 segment/no	160 x 64 pixel/yes
16/16/—/16	16/16/—/16	16/16/—/16	16/24/20/16	16/24/18/18
2	1	1	1	2
44.1	SX: up to 48; DPM 4 & 488 playback: 38.45	16, 22.05, 32, 44.1	22.05, 44.1	16, 22.05, 32, 44.1, 48
yes	no	yes	no	yes
12:41	0:12	17:19.2 (w/20Mb installed)	0:45	6:03.8
SDS, SMDI	SDS, SMDI	—	SDS	SDS
SP Plus: Akai (b, c)	—	—	Akai, Roland (a)	Akai, Roland (b, c)
SX II: prior, during	—	prior, during	prior, during	prior, during
32	32	4	8	24
fwd/1	fwd/1	fwd, latch/1	fwd/1	fwd, fwd + rev, fwd + one, rev, alternate/2
V, key pos, rand, wheel, chan & poly press, aux ctrls	V, key pos, rand, wheel, chan & poly press, aux ctrls	—	—	V, key pos, wheel
low	low w/Q	—	—	low, high, band w/Q
2/ASR	4/ADSR	1/preset gate, trigger, and drum	1/ADSR	2/DADSR
amp, filter, pitch, pan	amp, filter, pitch, pan, LFO amt & rate	—	amp	amp, filter
1/8	2/5	—	—	1/8
stereo merge	—	divide	norm	smooth (x-fade loop), norm, time comp/exp, rate conv, bit conv, combine
SP Plus: 5-band EQ, multi-tap delay, 8-voice chorus, reverb	40 algorithms, 4 simult effects	—	—	parametric EQ
—	DPM 4: 61 synth; DPM 488: 88 weighted	—	—	—
V, CA	V, CA	V, CA	V, CA	V, CA
—	9 trax, 96 ppq, pattern and linear recording	1-trk realtime phrase sequencer	4-trk realtime phrase sequencer	—
—	512Kb sample RAM $149	flash RAM cards: 1.8Mb $199, 2.5Mb $269, 5Mb $359 (10 & 20Mb also available)	—	monitor out/mouse/SPDIF $495, D/A converter $545
Aug. '94 (SP & SX II)	—	Nov. '95	—	Aug. '94
4 disks (1 drum, 1 piano/string/brass, 2 guitar/bass/analog synth)	3 disks (demo, organs, synths)	Sampling Showcase audio CD	Sampling Showcase audio CD	600Mb Preview and Rhythm Section 1 CD-ROMs, Sampling Showcase audio CD
each unit occupies a single rack space	see synth chart, page 40	eight front-panel trigger pads, can also run on six AA batteries	bpm adjust feature changes tempo of phrases in a performance	optional mouse and CRT functions, listen delete

Manufacturer contact list on page 162

HIGH TECHNOLOGY
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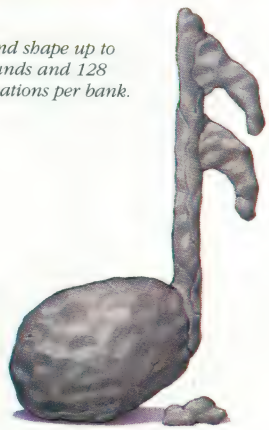
Mold and shape up to 256 sounds and 128 combinations per bank.



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letters

◀Continued from page 53

Wimpy Action

Does Jim Aikin play keyboards? Does Roland play their keyboards before releasing them? The XP-50 [Keyboard Report, Oct. '95] is sadly missing a responsive keyboard action. In general, I love Roland gear; my ten-year-old JX-8P, which has little weights under each key, is still my favorite keyboard. Jim Aikin in general is also great; I got rid of my TV on the suggestion of one of his columns and couldn't be happier about the effect on my musical productivity. But to not mention the pitiful feel of the XP-50's action is like an automobile magazine giving high marks to a car with no steering wheel.

Bob LaDelfa
Rochester, NY

As a new owner of a Roland XP-50 I was happy to see my purchase decision validated in your recent review. Regarding the sequencer, you *can* store header information in a song file; this procedure is detailed on p. 93 of the manual. On my wish list: An expansion board with all 8 megs dedicated to a single acoustic piano! As the review said, the acoustic piano is kind of weak, although tweaking the filter and amplitude envelopes improves it somewhat.

Rob Aries
via Internet

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I'm not saying that keyboards are without

Continued on page 88 ►

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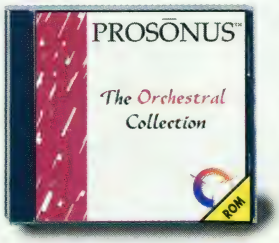

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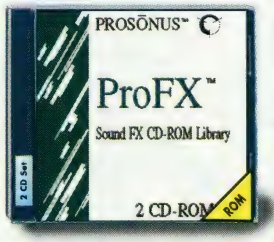

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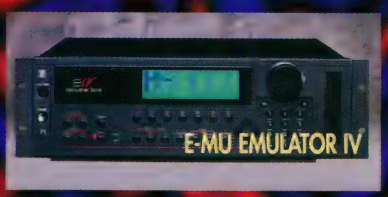

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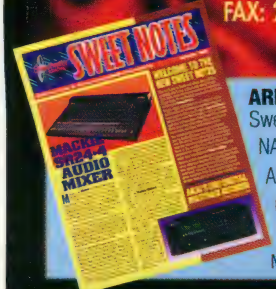

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CIRCLE READER SERVICE # 149

BUYER'S GUIDE

Digital Pianos & Piano Modules

BY **ERNIE RIDEOUT**

The digital pianos listed in the following chart all have two things in common. One, somewhere deep in their waveform memory, they each have at least one program designed to closely resemble the sound *of a piano.* Two, their keys are intended to approximate the feel of a piano action.

Other than that, these keyboards offer a range of feature sets as different as the colors of the rainbow. It'd be hard to come up with another instrument type that shares a name yet fills such widely varying niches. Clarinets? Accordions? Acoustic guitars have more in common with six-stringed electrics than most of these keyboards have with each other. Heck, some of these digital pianos wouldn't even be seen in the same room together.

This is good news. While few manufacturers or dealers would want to limit an instrument to a particular market ("ideal for home, stage, *and* studio!!"), you'll find that each one has a particular strength. For professional live gigging, the pickings are few but the quality is high. Inexpensive, portable starter keyboards are well represented. Many instruments have extensive software libraries for learning to play and playing along for fun. And, in keeping with the noble tradition of acoustic piano salesmanship, many are designed with your decorating needs in mind.

Most of these instruments have built-in amplification systems. This is a boon for living rooms and technophobes, since there will be a minimum of cables to bother with. Some are loud enough for close listening in a small room, others could fill a recital hall. And they all do what no purely acoustic piano can: They let you listen on headphones.

By and large, these are instruments that you'll want to set up and have them stay put. The portable ones are obvious; they're the ones with no stands and mere double-digit hefts. But the console-style cases can weigh upwards of 250 lbs. You're not even going to feel like vacuuming behind a piano of that mass.

Very few of these instruments have the ability to program sounds, to load new sounds, or to use the instrument to control an extensive MIDI rig. For the most part, they're designed to intimidate as little as possible, and limiting operating system features and simplifying the front panel is one way to achieve this.

A few digital pianos resembled synthesizers so much, they wound up on the synthesizer chart starting on page 40. Look for those with 88-key weighted actions among the 61-key synth types, and you'll find a couple more keyboards that you might be interested in.

Then there are those digital pianos that resemble little black boxes, the digital piano modules. Although these are sound modules, we felt that they'd be of greater interest to those specifically seeking quality digital piano sounds. Therefore, you'll find them on the following chart as well. As of this writing, there are only two on the market: the E-mu Proformance Plus and the Kurzweil MicroPiano. While it contains no acoustic piano sounds, the Voce Electric Piano module has been included here as well.

With the following listing of digital pianos and their kin, we endeavored to provide you with as complete and accurate a resource as possible. Because of space limitations, we've doubled up some entries that were either upgrades of base units or similar models with slightly different features. And while the manufacturers involved worked diligently to ensure that we received accurate information, none of it is a result of our own measurements or tests. Specs are subject to change, as you know.

As for the intelligibility of the chart, it seems clear to us. But then, we've been staring at the thing for weeks. Let's take a moment to explain what information is presented in each chart category. This also goes for the Portable Keyboard chart, found on page 94.

Manufacturer & Model. This lists the brand name of the instrument, which may be different than the company that markets or distributes it. We've provided cross-referenced contact entries in the Manufacturer Contact list on page 162, just in case. When more than one model number is listed, all specs apply to all models, except as noted. A dash, "—," indicates that a particular feature is not available on the instrument.

Suggested Retail Price. This is not as straightforward as one would think. First, you'll notice that there is a fantastic range of prices listed, from a little over $100 to over $10,000. Nothing too hard to understand about that. But then you'll also see that about half the instruments do not have prices indicated. How the heck do you figure out how to compare features between instruments when you've no idea whether you can afford them or not? Good question.

Some manufacturers do not publish, or even establish, retail prices for some instruments. The price you pay depends on your negotiating ability and the profit margin the dealer wants to make on the instrument.

Number of Keys/Type of Action. Counting keys is no problem. Describing a manufacturer's proprietary hammer emulation mechanism in one or two words is another thing. To approximate the feel of an acoustic piano, several approaches are common among digital pianos. The most common is to weight each key. In addition to that, the key might be returned to its original position by springs, a weighted extension over a fulcrum point, a counterbalanced lever underneath the key, or some other technique. The action of a digital piano is something that you simply must try out before you buy; the feel differs radically from one type to another. This is much less of an issue with portable keyboards, since the action tends to be unweighted, as on synthesizers.

Left-hand Controllers. Some instruments have pitch-bend or modulation wheels, especially if they have a lot of non-piano sounds or if they can be used as MIDI controllers. Some have sliders that you can assign a particular task.

Continued on page 78 ►

ABBREVIATIONS

ac p	acoustic piano
bs	bass
cd	Generalmusic CD format
chd	chords
clav	clavinet
DOC	Disc Orchestra Collection
Dsklv	Yamaha Disklavier
d kit	drum kit
elec p	electric piano
elec org	electronic organ
hpsch	harpsichord
hph	headphone
ht p	honky-tonk piano
ism	Roland ism
lyr	lyrics
mba	marimba
mel	melody
metro	metronome
MIDI edit	MIDI tx channel of parts editable
mod	modulation wheel
1-finger	one-finger or "easy-play" chords
patsw	pattern switch
pd	PianoDisc
p org	pipe organ
pb	pitch-bend
punch	punch-in/out
quan	quantization
save	save songs to floppy disk
strt/stp	seq start/stop
sim	simultaneous
SMF	Standard MIDI File on DOS disk
sost	sostenuto
str	strings
sust	sustain
tnsps	transpose per split
user-save	user styles saved in memory
user-rec	user-recordable styles
vc	velocity curves, number
vib	vibes
vol	volume
WS	Wurlitzer Song format
WX	Wurlitzer sequence format

Digital Pianos & Piano Modules

	Baldwin GRP-3, RP-2, RP-1	Casio CPS-80	E-mu Proformance Plus Module	Kawai CA840, CA640, CA440	Kawai KSP 30, KSP 10, KSP 5	Kawai PN80, PN60
Suggested Retail Price	GRP-3: $7,990; RP-2: $4,490; RP-1: $3,490	$1,499	$399	???	???	???
Number of Keys/ Type of Action	88/rotary hammer, weighted spring	88/weighted	—	88/counter-balanced wooden keys	KSP 30, KSP 10: 88; KSP 5: 76/ CB	PN80: 88; PN60: 76/weighted spring
Left-hand Controllers	—	—	—	—	—	—
Polyphony/ Multitimbral parts	128/16; RP-1: 64/16	16/1	32/—	32/15	KSP 30: 47; KSP 10: 32/16	24/8
#/type of Sounds/GM	3 ac p, 6 elec p, 1 ht p, 2 hpsch, 4 elec org, 2 p org, 2 vib, 4 bs, 6 other	10 sounds	stereo, 16 ac p, 4 elec p, 1 ht p, 2 elec org, 2 vib, 7 bs	2 ac p, 2 elec p, 1 hpsch, 1 elec org, 2 p org, 1 vib, 3 bs, str, clav, bell	GM	2 ac p, 1 elec p, 1 hpsch, 1 p org, 1 vib, choir, (PN80: str)
Keyboard Modes	split, layer, 3 vc	—	split	split, layer, 3 vc	split, layer, 5 vc	layer, 4 vc
Effects	2 sim; 16; RP-1: 2 sim; 6	—	—	2 sim; 4	1 sim; 6	2 sim; 3
Auto-accompaniment Styles	—	—	—	—	4 pop, 2 8-beat, 2 16-beat, 2 R&R, 2 shuf, 2 blues, 2 oldies, 2 dance, 2 sft rck, 2 bgie, 2 showbeat, 2 folk, 2 bgrass, 2 cntry, 2 cntry pop, 2 swng, 2 dixie, 2 Nw Orlns, 2 big bnd, 2 samba, 2 Latin, 2 Jamaica, 2 paradise, 2 wltz, 2 Euro wltz, plka, 2 mrch, 2 bossa, 2 gospel, 1 salsa, 1 mambo, 1 tango, 1 beguine	—
Patterns per Style/ Instrumental Parts per Style (Max)	—	—	—	—	6/5; 1 finger	—
Disk Drive Reads/Writes	none	none	none	none	SMF/—	none
Power-up Memory/ External Memory	yes/—	—	—	—	—	—
Sequencer	2/45,000/192 ppq/1; metro; RP-1: 1/15,000/192 ppq/1; metro	1/1,200/96 ppq/2	—	2/5,000/96/5, metro	KSP 10, KSP 5: 3/5,000/96 ppq/3; KSP 30: 16/70,000/96 ppq/100, save, metro	2/1,200/48/3, metro
Display	GRP-3: Backlit LCD 40 x 2 line; RP-2: Backlit LCD 16 x 2 line; RP-1: —	—	—	—	16 ch x 2 line backlit LCD, chd	—
Pedals, Jacks	sust, sost, soft	—	—	sust, sost, soft	KSP 30: sust, sost, soft; KSP 10, KSP 5: sust, soft	sust, soft
Amplifier and Speakers	GRP-3: 2 x 70W; 2 x 6", 2 x 2"; RP-2: 2 x 40W; 2 x 6", 2 x 2"; RP-1: 3 x 25W; 2 x 5", 2 x 2"	2 x 5W, 2 x 5-1/2"	—	CA840: 2 x 40W, 2 x 9", 2 x 6", 2 x 2"; CA640: 2 x 30W, 2 x 5", 2 x 2"; CA440: 2 x 20W, 2 x 5"	KSP 30: 2 x 40W, 2 x 9" x 6", 2 x 2": KSP 10: 2 x 40W, 2 x 9" x 6", 2 x 2"; KSP 5: 2 x 20W, 2 x 4-1/2", 2 x 2"	2 x 7W, 2 x 4-1/2"
Audio In/Out	In: 2 x 1/4"/Out: 2 x 1/4", 2 x 1/4" hph	Out: 2 x 1/4", 1 x 1/4" hph	Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x RCA/Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x RCA/Out: 2 x RCA, 2 x 1/4" hph (KSP 5: 1 hph)	In: 2 x 1/4"/Out: 2 x 1/4", 2 x 1/4" hph
Cabinet/Stand/Bench	GRP-3: Wood veneer grand in polished ebony or white, or satin ebony or cherry; RP-2: Rosewood or walnut simulated wood grain console; RP-1: Rosewood simulated wood grain console/bench	Black metal case	Black case	Simulated wood console	KSP 30, KSP 10: Simulated wood; KSP 5: Black/stand	Black console/bench
Weight and Dimensions	GRP-3: 230 lbs; 54" x 20" x 43"; RP-2: 195 lbs; 58" x 20" x 36"; RP-1: 140 lbs; 58" x 18" x 34"	39 lbs, 8 oz; 54" x 16-3/10" x 4"	2 lbs, 8-1/2" x 8-1/2" x 1-3/4"	150 lbs; 56" x 20" x 42-1/2"	KSP 30: 146 lbs, 54-1/2" x 22" x 33"; KSP 10: 128 lbs, 54-1/2" x 19" x 31-1/2"; KSP 5: 99 lbs, 47" x 18" x 31-1/2"	18 lbs, 48" x 17-3/8" x 31-1/8"
Other	GRP-3 and RP-2 only: 283-piece recorded classical library. Optional cherry, golden oak, ebony oak veneer (RP-2LE)		Transpose ±2 octaves, ±1 octave in semitones.		KSP 30: 7 temperaments; KSP 10, KSP 5: 6 temperaments.	

Korg C-15S	Korg C-505, C-303	Korg C-56G, C-56FP	Korg i1	Kurzweil Mark 150, Mark 10	Kurzweil Mark 5
$1,800	C-505: $2,900; C-303: $2,700	C-56G: $6,350; C-56FP: $7,200	$5,750	???	???
88/counter-balanced	88/counter-balanced	88/counter-balanced	88/adjustable	88/weighted	88/weighted
—	—	—	pb, mod on joystick	pb	—
16/6	32/4	32/11	32/16	32/16	32/8
1 ac p, 1 elec p, 1 hpsch, 1 p org, 1 vib	1 ac p, 1 elec p, 1 hpsch, 1 p org, 1 vib, 1 bs, str	2 ac p, 2 elec p, 1 hpsch, 1 elec org, 1 p org, 1 vib, 1 bs, str, gtr, d kit	Stereo, GM	6 ac p, 4 elec p, 2 ht p, 2 hpsch, 2 elec org, 4 p org, 2 vib, 6 bs, 58 other/GM	4 ac p, 2 elec p, 2 ht p, 2 hpsch, 2 elec org, 2 p org, 4 bs, gtr, choir, str, d kit
layer, 1 vc	split, layer, 3 vc	split, layer, 3 vc	split, trans, layer, 8 vc	split, trans, layer, 7 vc	split, trans, layer, 7 vc
—	4 sim, 6	4 sim, 8	2 sim, 47	2 sim; 40	2 sim; 16
—	—	—	16 rck, 14 dnce, 14 Latin, 8 wltz/plka, 4 shuf, 13 traditional/ethnic, 8 jz/bg bnd, 3 oldies, 4 fnk, 2 pop ballad, 1 cntry, 1 R&B, 1 tngo, a cha-cha, 1 mrch, 1 3/4 pop, 1 brdwy, 1 dixie, 1 flm score, 2 16-beat	32 styles	—
—	—	—	36/8, 1-finger, user-rec, user-save, MIDI edit	18/16; 1 finger, user save	—
none	none	none	SMF/SMF	SMF, PD, Dsklv/Kurzweil	none
—	—	—	yes/512Kb RAM card slot	yes/—	—
—	3/2,600/???/1, metro	16/3,400/???/1, metro	16/48,000,96 ppq/10, quan, punch, save, metro	8/25,000/???/8; quan, punch, save, metro	—
—	—	—	Backlit LCD, 240 x 64 pixel	3 char LED	—
sust, sost	sust, sost, soft	sust, sost, soft	sust, sost, patsw	sust, sost, soft	sust, sost, soft
2 x 30W, 2 x 6"	2 x 30W, 2 x 6-3/8"	200W, 4 x 4", 1 x 12"	2 x 40W, 2 x 6-3/10", 2 x 2"	Mark 150: 200W 7-channel; 1 x 12", 2 x 6-1/2", 2 x 5", 2 x 1"; Mark 10: 130W quad; 2 x 6-1/2", 2 x 1"	2 x 25W, 2 x 15W; 2 x 6-1/2", 2 x 1"
In: 2 x RCA/Out: 2 x RCA, 1 x 1/4" hph	In: 2 x RCA/Out: 2 x RCA, 2 x 1/4" hph	In: 2 x RCA/Out: 2 x RCA, 1 x 1/4" hph	In: 2 x 1/4"/Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x RCA/Out: 4 x RCA, 1 x 1/4" hph	In: 2 x RCA /Out: 4 x RCA, 1 x 1/4" hph
Black walnut veneer console	Dark red wine or walnut simulated wood grain console	C-56G: Solid cherry grand; C-56FP: Solid wood grand, brushed satin finish/bench	Black case/stand	Mark 150: Solid wood grand; Mark 10: Plastic console/bench	Black plastic console/bench
92 lbs, 54" x 18" x 32"	C-505: 132 lbs, 13 oz, 54-3/8" x 18" x 33"; C-303: 122 lbs, 54-3/8" x 18" x 32-1/4"	259 lbs, 57" x 35-1/2" x 34-1/2"	96 lbs, 59-1/4" x 21-1/10" x 6-15/16"	Mark 150: 510 lbs; 58-1/4" x 59" x 39-3/4"; Mark 10: 179 lbs; 56" x 22-3/4" x 31-3/4"	176 lbs; 56" x 22-3/4" x 31-3/4"
				Mark 150: Optional finish. Mark 10: Optional wood veneer	

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Digital Pianos & Piano Modules

	Kurzweil MicroPiano	Kurzweil RG 200, RG 100	Oberheim Eclipse	Peavey Millenium DK-40, Millenium DK-20	Roland ep-9, ep-7 II	Roland FP-1
Suggested Retail Price	$495	???	$2,495	???	ep-9: $1,695; ep-7II: $1,345	$2,195
Number of Keys/ Type of Action	—	88/weighted hammer	88/weighted spring	88/weighted counter-balanced	ep-9: 88; ep-7II: 76/weighted spring	88/hammer action
Left-hand Controllers	—	—	pb, mod (MIDI out only)	—	—	—
Polyphony/ Multitimbral parts	32/—	32/—	32/—	DK-40 64/16; DK-20: 32/—	28/—	28/—
#/type of Sounds/ GM	9 ac p, 10 elec p, 1 ht p, 6 elec org, 5 str, 1 pad	RG 100: 1 ac p, 1 elec p, 1 str, 1 p org; RG 200 add: 1 ac p, 1 vib, 1 hpsch, 1 elec org, 1 choir	3 ac p, 2 elec p, 1 hpsch, 1 elec org, 1 p org, 1 vib, 1 str, 2 bs	DK-40: 2 ac p, 2 elec p,2 elec org, 2 p org/GM optional; DK-20 add: 2 ht p, 1 hpsch, 1 vib, 2 str, 2 pad	2 ac p, 1 elec p, 1 hpsch, 1 p org, 1 vib, 1 str, 1 choir	2 ac p, 1 elec p, 1 ht p, 1 synth str, 1 str
Keyboard Modes	layer, 4 vc	—	split, layer, 3 vc	layer, 3 vc	layer	layer
Effects	2 sim; 16	2 sim; 4	4 sim; 8	2 sim, 3	2 sim; reverb, chorus	2 sim; reverb, 5 chorus
Auto-accompaniment Styles	—	—	—	—	—	—
Patterns per Style/ Instrumental Parts per Style (Max)	—	—	—	—	—	—
Disk Drive Reads/Writes	none	none	none	none	none	none
Power-up Memory/ External Memory	—	—	—	Yes/—	—	—
Sequencer	—	1/12,000/???/0; metro	—	DK-40 only: 1/10,000/96 ppq/1, metro	1/1600/96 ppq/4	—
Display	2 char LED	—	—	DK-40 only: Backlit LCD 14 ch x 1 line	—	—
Pedals, Jacks	—	sust, sost	sust, sost, soft; jack: vol (strings); assignable	DK-40: sust, sost, soft; DK-20: sust, soft	sust	sust; jacks: sost, vol
Amplifier and Speakers	—	2 x 10W; 2 x 4-1/2", 2 x 2-1/2"	—	DK-40: 4 x 35W, 2 x 6-1/2", 2 x 1"; DK-20: 2 x 35W, 2 x 5", 2 x 1"	2 x 5W, 2 x 4"	—
Audio In/Out	Out: 2 x 1/4"	In: 2 x RCA/ Out: 2 x RCA, 1 x 1/4" hph	Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4"/ Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4"/ Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4"/ Out: 2 x 1/4", 1 x 1/4" hph
Cabinet/Stand/ Bench	Black case	Tabletop case	Beige metal case	Oak, mahogany, or ebony solid wood console/bench	Black plastic case; ep-9: stand	Black metal case
Weight and Dimensions	3 lbs, 8 oz, 8-1/2" x 9-6/10" x 1-3/4"	RG 200: 71 lbs; 51-3/4" x 17-3/4" x 5"; RG 100: 56 lbs; 51-3/4" x 17-3/4" x 5"	66 lbs, 10 oz; 53-1/2" x 15-1/2" x 6"	DK-40: 145 lbc, 52" x 21" x 32"; DK-20: 110 lbs, 52" x 21" x 32"	ep-9: 45 lbs, 7 oz; 51" x 14-9/16" x 30-1/2"; ep-7II: 24 lbs, 4 oz; 44-13/16" x 13-3/8" x 3-15/16"	53 lbs; 52-5/8" x 13-3/4" x 5-5/16"
Other	Link mode with 2nd unit for 64-voice polyphony	Options: SB-10 bench, KFP-25 double pedal	Tuning knob. Road case included. Transmits aftertouch via MIDI	DK-40: optional Mediawave GM expansion board, $199	Tuning knob. ep-7II: optional ep-AK2E stand, $129.	Tuning knob. Optional FPS-1 stand w/2x 10W amplifier, 2 x 6" speakers, $435.

Roland HP-2800, HP-1800, HP-1500, HP-1300e	Roland HP-3800G, HP-2800G, HP-1900G	Roland HP-5700	Roland KR-5000, KR-4700	Roland RD-500	Samick SXP501, SXP401
???	???	???	???	$2,895	???
88/2800: hammer action; 1800, 1500, 1300e: weighted	3800, 2800: 88/ hammer action; 1900: 88/rotary oil-damped	88/hammer action	88/rotary oil-damped	88/hammer action	88/counter-balanced
—		—	pb	pb, mod, 2 control sliders	—
2800, 1800, 1500: 28/7; 1300e: 28/6	28/16	32/8	28/16	28/8	32/16
stereo, 1 ac p, 1 elec , 1 ht p, 1 hpsch, 1 p org, 1 vib, 1 str; 2800 add: 1 ac p	65/GM	stereo, 2 ac p, 1 elec , 1 ht p, 1 hpsch, 1 p org, 1 vib, 1 str	65/GM	33 ac p, 21 elec p, 3 hp-sch, 7 elec org, 3 p org, 7 vib, 16 synth, 12 str, 10 bs, 3 mba, 1 d kit	Stereo, 3 ac p, 2 elec p, 1 ht p, 1 hpsch, 4 elec org, 1 p org, 1 vib, 8 bs, 1 mba/GM
layer; 2800: 4 vc, others: 3 vc	split, layer, 3 vc	layer, 4 vc	split, layer, 3 vc	2 split w/tnsps; layer; 4 vc,	Split, layer, tnsps, 4 vc
6 reverb, 6 chorus	7 reverb, 7 chorus	7 chorus, 7 reverb	7 reverb, 7 chorus	2 sim, reverb, chorus, tremolo, vibrato, 3-band EQ	2 sim; 16
—	—	—	74	—	
—	—	—	4/5; 1-finger, user save	—	
none	SMF, PD, Dsklv, ism/ism	none	SMF, PD, Dsklv, ism/SMF, ism	none	SMF/SMF
—	Yes/—	—	Yes/ROM card	Yes/—	Panel memory storage/—
2800: 2/2,500/???/2, metro; 1800, 1500, 1300e: 1/2,000/???/1; metro	5/21,000/???/3800, 2800: 50; save, metro	—	6/20,000/—/1; quan, punch, save, metro	—	8/20,000/96/1; save, metro
LCD 3 ch	LCD 3 ch	—	LCD, 16 ch x 2 line	3 char LED	LCD 128 x 64 pixel
sust, sost, soft	sust, sost	sust, sost, soft	sust, sost, strt/stp; jack: vol	sust; jacks: sost, vol	sust, sost, soft, patsw, strt/stp, assign
2800: 2 x 30W, 2 x 6"; 1800: 2 x 20W, 2 x 6"; 1500, 1300c: 2 x 15W, 2 x 6"	3800: 2 x 40W, 2 x 8"; 2800: 2 x 30W, 2 x 8"; 1900: 2 x 20W, 2 x 6"	2 x 45W; 2 x 8", 4 x 2"	5000: 2 x 40W, 2 x 8", 4 x 3"; 4700: 2 x 25W, 2 x 8"	—	SXP501: 2 x 45W; 1 x 10", 1 x 5", 2 x 3"; SXP401: 2 x 45W; 2 x 8", 2 x 3"
In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	Out: 4 x 1/4", 1 x 1/4" hph	In: 2 x 1/4", 1 x 1/4" mic; Out: 1 x 1/4", 2 x 1/4" hph
Rosewood, stand, bench	3800: Dark walnut; 2800, 1900: Rosewood cabinet/stand/bench	Black lacquer console, bench	Rosewood stand, bench	Black metal case	SXP501: Grand with high-polish ebony, ivory, white, mahogany, or walnut finish/bench; SXP401: Veneered console with provincial cherry, traditional cherry, French provincial oak, Mediterranean Oak/bench
2800: 134 lbs, 57" x 19" x 33"; 1800: 128 lbs, 56" x 18" x 32"; 1500: 102 lbs, 56" x 18" x 32"; 1300c: 104 lbs, 56" x 18" x 32"	3800: 170 lbs, 57" x 22" x 35"; 2800: 136 lbs, 57" x 20" x 33"; 1900: 114 lbs, 56" x 18" x 32"	222 lbs, 58" x 21-1/2" x 34"	5000: 208 lbs, 58" x 21" x 33"; 4700: 157 lbs, 56" x 21" x 33"	55 lbs, 2 oz; 55-7/8" x 15-7/16" x 5-9/16"	SXP501: 185 lbs; 55" x 36" x 34"; SXP401: 189 lbs; 55" x 23-1/2" x 37"
	—			Tuning knob; Optional RS-80 stand, $150.	Help menu. Karaoke feature.

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Digital Pianos & Piano Modules

	Samick SXP511, SXP411, SXP311	Technics SX-PC200, SX-PC100	Technics SX-PR307, SX-PR305, SX-PR303	Technics SX-PX207, SX-PX205, SX-PX203, SX-PX201	Viscount Classico GSV-1000, SV-120, SV-100	Viscount Classico SV-80, SV-70, SV-60
Suggested Retail Price	???	PC-200: $2,595.95; PC100: $1,495.95	SX-PR307: $8,695.95; SX-PR305: $7,395.95; SX-PR303: $5,695.95	207: $6,295.95; 205: $4,995.95;203: $3,795.95; 201: $2,995.95	???	???
Number of Keys/ Type of Action	88/counter-balanced	PC200: 88; PC100: 76/weighted	88, weighted	88 weighted	88/weighted hammer	88/weighted
L-hand Controllers	—	—	—	—	—	—
Polyphony/ Multitimbral parts	32/16	32/6	32/16	207: 64/10; 205, 203, 201: 32/6	64/2	32/—
#/type of Sounds/ GM	Stereo, 3 ac p, 2 elec p, 1 ht p, 1 hpsch, 4 elec org, 1 p org, 1 vib, 8 bs, 1 mba/GM	Stereo; 1 ac p, 2 elec p, 1 hpsch, 1 p org; PC200 add: 1 ht p; PC100 add: 1 ac p	307/305/303: Stereo; 3/3/3 ac p, 6/6/5 elec p, 1/1/1 ht p, 2/2/1 hpsch, 9/9/1 elec org, 3/3/1 p org, 1/1/1 vib, 1/1/1 mba, 12/12/3 bs, 161/142/148 other/GM	Stereo; 2 ac p, 2 elec p, 1 ht p, 1 hpsch, 1 p org; 207, 205 add: 1 ht p, 1 vib; 207 add: 1 str, 1 choir	Stereo, 3 ac p, 2 elec p, 1 hpsch, 1 elec org, 1 p org, 1 vib, 2 bs, 1 str	Stereo, 2 ac p, 2 elec p, 1 vib/
Keyboard Modes	Split, layer, tnsps, 4 vc	layer	307, 305: split (tnsp), layer; 303: split, layer	layer; 207: 3 vc	Split, layer, 3 vc	3 vc
Effects	2 sim; 16	2 sim; 4 reverb, celeste	2 sim; 5	207, 205: 3 sim; 5; 203, 201: 2 sim; 4	3 sim; 3	2 sim; 2
Auto-accompaniment Styles	2 pop, 8 rock, 3 waltz, 4 dance, 5 Latin, 2 polka, 2 march, 2 swing, 2 big band, 4 country, 3 gospel, 2 ballad, 2 jazz, 1 baroque, 1 broadway	—	307/305/303: 8/6/3 8-beat, 8/6/3 rock-disco, 8/6/3 16-beat, 6/6/3 rock, 8/6/0 modern rock, 8/6/3 swing, 8/6/3 jazz combo, 8/6/3 country/r&b, 6/6/3 showtime, 6/6/3 march/polka, 6/6/3 trad, 14/12/6 Latin, 6/6/3 waltz; 303: 31 misc.	—	—	—
Patterns per Style/ Instrumental Parts per Style (Max)	6/7; 1-finger	—	4/5; 1-finger, user-rec, user-save; 307 add: MIDI edit	—	—	—
Disk Drive Reads/Writes	SMF/SMF	none	307: SMF, Dsklv, Tech-note; 305, 303: SMF, Tech-note/SMF	none	none	none
Power-up Memory/ External Memory	Panel memory storage/—	Yes/—	307 only: Yes/—	Yes/—	—	—
Sequencer	8/20,000/96/1; save, metro	PC100: 1/4,000/96 ppq/1	16/19,000/96 ppq/1, quan, punch, save, metro	207, 205, 203: 2/4,000/96 ppq/1, metro	—	—
Display	LCD 128 x 64 pixel	—	LED	207 only: LED	—	—
Pedals, Jacks	sust, sost, soft, patsw, strt/stp, assign	sust; PC200 add: sost, soft	sust, sost, soft; 305 only: strt/stp	sust, sost, soft	sust, sost, soft, assign; GSV-1000 add: Leslie on/off	sust, sost, assign; SV-80 add: soft
Amplifier and Speakers	SXP511: 2 x 45W; 1 x 10", 1 x 5", 2 x 3"; SXP411: 2 x 45W; 2 x 10", 2 x 3"; SXP311: 2 x 20W; 2 x 5", 2 x 3"	PC200: 2 x 25W; 2 x 5-1/2"; PC100: 2 x 15W; 2 x 4-3/4"	307: 2 x 60W; 2 x 6-5/16", 2 x 9/16", 2 x monitor; 305: 2 x 50W; 2 x 6-5/16", 2 x 9/16", 2 x monitor; 303: 2 x 25W; 2 x 6-5/16", 2 x 9/16"	207: 2 x 60W;2 x 5-1/2", 2 x 4-23/32, 2 x 2-9/16; 205: 2 x 40W;2 x 5-1/2", 2 x 2-9/16; 203: 2 x 25W; 2 x 5-1/2"; 201: 2 x 20W; 2 x 5-1/2"	GSV-1000: 2 x 70W; SV-120: 2 x 35W; SV-100: 2 x 35W; speakers, all models: 2 x 6-1/5", 2 x 3-9/10", 2 x 2-1/5"	SV-80: 2 x 35W; 2 x 6-1/5", 2 x 3-9/10", 2 x 2-1/5"; SV-70: 2 x 35W; 2 x 6-1/5"; SV-60: 2 x 35W; 2 x 6-1/5"
Audio In/Out	In: 2 x 1/4", 1 x 1/4" mic/Out: 1 x 1/4", 2 x 1/4" hph	In: 4 x 1/4" Out: 4 x 1/4", 2 x 1/4" hph	307, 303: In: 2 x 1/4"/Out: 2 x 1/4", 2 x 1/4" hph; 303: Out: 2 x 1/4" hph	In: 4 x 1/4" Out: 4 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph
Cabinet/Stand/ Bench	SXP511: Veneered grnd w/ hi-polish ebony, ivry, wht, mhgny, or wlnut fnsh/bnch; SXP411: Veneered cnsle w/prvincial chry, trdtnl chry, Frnch provincial oak, Mdtrn Oak/bnch; SXP311: blk mtl cs/stnd	Simulated ebony console	307, 305: Black or walnut simulated wood grain console/bench; 303: Black plastic console	Simulated ebony or walnut console	GSV-1000: Grand, ebony or white polish; SV-120: Solid wood console, mahogany, walnut, ebony, or white polish; SV-100: Solid wood console, black or ebony satin finish, or ebony or white polish finish/bench	SV-80: Solid wood console, black or ebony satin finish, or ebony or white polish finish; SV-70: Oak satin solid wood console; SV-60: Black satin solid wood console
Weight and Dimensions	SXP511: 185 lbs; 55" x 36" x 34"; SXP411: 189 lbs; 55" x 23-1/2" x 37"; SXP311: 185 lbs, 55" x 36" x 34"	PC200: 97 lbs; 54-1/16" x 38-5/16" x 17-27/32"; PC100: 50 lbs, 11 oz; 48-7/32" x 36-7/32" x 16-21/32"	307: 167 lbs, 9 oz; 56-13/32" x 41-3/16" x 23-9/32"; 305: 149 lbs, 15 oz; 55" x 40-7/8" x 23"; 303: 116 lbs, 13 oz; 56-1/16" x 40" x 23-7/16"	207: 145 lbs, 8 oz; 54-19/32" x 43" x 20-1/32"; 205: 132 lbs, 5 oz; 54-3/8" x 41-13/16" x 19-31/32"; 203: 97 lbs; 54-1/16" x 39-1/2" x 19-9/32"; 201: 97 lbs; 54-1/16" x 38-5/16" x 17-27/32"	GSV-1000: 265 lbs; 55" x 52" x 36"; SV-120: 155 lbs; 55" x 21" x 36"; SV-100: 137 lbs; 55" x 21" x 34"	SV-80: 137 lbs; 55" x 21" x 34"; SV-70, SV-60: 95 lbs; 55" x 21" x 34"
Other	Help menu. 100 Karaoke feature				Transpose feature. Separate string volume. Adjustable effects	Transpose feature

Voce Electric Piano Module	Wersi CT-2, CPF-2	Wurlitzer WD-450	Wurlitzer WX-400	Yamaha Clavinova CLP123	Yamaha Clavinova CLP153S, CLP152S
$549	CT-2: $5,490; CPF-2: $3,490	$7,980	$5,983	$3,965; white finish: $4190	CLP153S: $2,655; CLP152S: $2,215
—	88/balanced hammer	88/rotary hammer, weighted spring	88/rotary hammer, weighted spring	88/counter-balanced	CLP153S: 88; CLP152S: 76/counter-balanced
—	—	pb	pb & mod on trackball	pb, mod	—
32/3	64/8	32/16	32/16	32/—	28/—
32 elec p	2 ac p, 4 elec p, 1 hi p, 1 hpsch	8 ac p, 8 elec p, 4 ht p, 4 hpsch, 16 elec org, 4 p org, 2 vib, 22 bs, 128 other/GM	10 ac p, 7 elec p, 2 ht p, 3 hpsch, 13 elec org, 2 p org, 3 vib, 344 other/GM	2 ac p, 2 elec p, 1 hpsch, 1 elec org, 1 p org, str	1 ac p, 2 elec p, 1 hpsch, 1 p org
—	split, layer, 10 vc	split, tnsps right split only, layer, 4 vc	split, tnsps, layer, 5 vc	layer, 3 vc	layer
3 sim, 3	7 sim; 12	2 sim; 23	2 sim; 48	2 sim, 8	—
—	—	33 rock, 10 Latin, 13 traditional, 6 country, 2 ethnic	8 dance, 8 8-beat, 8 rock, 8 jazz, 8 Latin, 8 folk, 8 ethnic, 8 pop	—	—
—	—	11/6; 1-finger, user rec, user save, MIDI edit	5/6; 1-finger, user rec, user save, MIDI edit	—	—
none	none	SMF/SMF	SMF, WX, WS/SMF, WX	none	none
—	—	—	yes	—	—
—	—	16/140,000/48 ppq/1; quan, save, metro	16/250,000/192 ppq/8; quan, punch, save, metro	—	1/1,300/—/0, metro
—	—	Backlit LCD, 24 ch x 2 line; lyr	Bckit LCD, 240 x 64 pixel; mel, lyr, chd (int+ext)	—	—
jacks: wah wah	sust, sost	3 programmable to sust, sost, patsw, strt/srp	3 prgrmbl to sust, sost, patsw, strt/srp, vol, soft, rotary spd	sust, sost, soft	sust, soft
—	CT-2 only: 200W; 2 x 8", 4 x 2", 2 x tweeter	3 x 100W; 4 x 5", 1 x 12"	2 x 40W; 2 x 6", 4 x 2"	2 x 30W, 2 x 5", 2 x 2"	2 x 20W, 2 x 6-1/4"
Out: 2 x 1/4"	In: 2 1/4" line, 2 x 1/4"/Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph
Black case	CT-2: White, black, walnut, or rosewood veneer console/bench; CPF-2: Black metal case	Grand w/ebony or cherry wood veneer	Black metal console/bench	Dark rosewood simulated wood grain console (white at extra cost)/bench	Simulated wood grain dark rosewood console
4 lbs, 8" x 9" x 1-3/4"	CT-2: 125 lbs; 52" x 21" x 32": CPF-2: 80 lbs; 52" x 21" x 9"	195 lbs; 56" x 20" x 31"	167 lbs; 56" x 14" x 33"	130 lbs, 57" x 18" x 33"	CLP153S: 119 lbs, 54" x 18" x 32"; CLP152S: 108 lbs, 47" x 18" x 32"
Analog effects. Additive synthesis			WX-400NV w/o external video, $5,317	sliding key cover	

Manufacturer contact list on page 162

Digital Pianos & Piano Modules

	Yamaha Clavinova CLP155, CLP154S	Yamaha Clavinova CLP157, CLP156	Yamaha Clavinova CVP49	Yamaha Clavinova CVP79, CVP69, CVP59S	Yamaha Clavinova CVP89	Yamaha P150
Suggested Retail Price	CLP155: $4,435; CLP154S: $3,500	CLP157: $5,855; CLP156: $4,775	$3,995	CVP79: $7,995; CVP69: $6,655; CVP59S: $5,095	$10,655	$2,295
Number of Keys/ Type of Action	88/counter-balanced	88/counter-balanced	76/counter-balanced	88/counter-balanced	88/counter-balanced	88/counter-balanced
Left-hand Controllers	—	—	—	—	—	pb, mod, assignable slider
Polyphony/ Multitimbral parts	32/—	32/—	32/16	32/16	64/16	32/2
#/type of Sounds/GM	2 ac p, 2 elec p, 1 hpsch, 1 elec org, 1 p org; CLP155 add: 1 vib, str, stereo	Stereo; 2 ac p, 2 elec p, 1 hpsch, 1 p org, 1 vib, str; CLP157 add: 1 ac p, 1 elec p	6 ac p, 6 elec p, 1 ht p, 2 hpsch, 4 elec org, 3 p org, 2 vib, 2 mba, 12 bs, 40 other/GM	CVP79 (stereo)/CVP69, CVP59S: 5/5 ac p, 8/6 elec p, 1/1 ht p, 4/3 hpsch, 7/5 elec org, 2/2 p org, 2/2 vib, 1/1 mba, 14/11 bs, 64/44 other/GM	6 ac p, 6 elec p, 1 ht p, 2 hpsch, 4 elec org, 3 p org, 2 vib, 2 mba, 12 bs, 40 other/GM	stereo, 4 ac p, 3 elec p, 2 elec org, 1 vib, 2 bs, str
Keyboard Modes	layer, 3 vc	layer, 3 vc	split, layer, 3 vc	CVP79, CVP69: split, layer; all: 5 vc	split, trans, layer, 3 vc	split, trans, layer, 10 vc
Effects	CLP155 only: 2 sim, 8	CLP157 only: 3	4	CVP79: 30; CVP69, CVP59S: 11	—	2 sim, 6
Auto-accompaniment Styles	—	—	24	100	50	—
Patterns per Style/ Instrumental Parts per Style (Max)	—	—	4/4, 1-finger	4/8, 1-finger, user-rec, user-save, MIDI edit	4/4, 1-finger, user-rec, user-save, MIDI edit	—
Disk Drive Reads/Writes	none	CLP156 only: Pianosoft/Pianosoft	none	SMF, Dsklv, DOC/SMF, Dsklv	SMF, Dsklv, DOC/SMF, Dsklv	none
Power-up Memory/ External Memory	—	yes/—	—	yes/—	yes/—	yes/—
Sequencer	2/4600/???/0, metro	CLP157: 2/4600/???/0, metro; CLP156: 2/57,000/???/0, save, metro	4/8,000/???/0, metro	16/???/???/32, quan, punch, save, metro	11/???/???/32, quan, punch, save, metro	—
Display	—	CLP156 only: LED	LED	LCD, 240 x 64 pixel; CVP79, CVP69: backlit	LCD, 24 ch x 2 line	Backlit LCD, 16 ch x 2 line
Pedals, Jacks	sust, sost, soft	sust, sost, soft	sust, strt/stp, soft	sust, patsw, strt/stp, soft; CVP79, CVP69 add: sost	sust, sost, patsw, strt/stp, soft; vol jack	sus; jacks: soft, sost, assignable foot controller
Amplifier and Speakers	CLP155: 2 x 30W, 2 x 5", 2 x 2"; CLP154S: 2 x 20W, 2 x 6-1/4"	CLP157: 2 x 50W, 2 x 6-1/4", 2 x 4", 2 x 2"; CLP156: 2 x 5", 2 x 2"	2 x 30W, 2 x 5", 2 x 2"	CVP79: 2 x 60W, 2 x 5", 4 x 2"; CVP69: 2 x 60W, 2 x 5", 2 x 2"; CVP59S: 2 x 30W, 2 x 5", 2 x 2"	2 x 100W, 1 x 7", 2 x 5", 2 x 3", 2 x 1"	2 x 30W, 2 x 5-1/8"
Audio In/Out	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph
Cabinet/Stand/ Bench	Dark rosewood simulated wood grain console (wht @ extra cost)/bench	Simulated wood grain dark rosewood console	black plastic case/stand/bench	Simulated wood grain dark rosewood console/bench	Simulated dark rosewood, white, or clear polyester grand/bench	Black case
Weight and Dimensions	137 lbs, 56" x 20" x 35"	CLP157: 153 lbs, 56" x 20" x 35"; CLP156: 151 lbs, 56" x 20" x 32"	97 lbs, 49" x 22" x 31"	CVP79: 150 lbs, 56" x 23" x 33"; CVP69: 158 lbs, 56" x 23" x 33"; CVP59S: 144 lbs, 55" x 22" x 32"	183 lbs, 57" x 26" x 33"	74 lbs, 11 oz, 54-1/2" x 16-3/4" x 6-1/4"
Other	CLP155: sliding key cover, 8-position damper pedal	8-position damper pedal. Sliding key cover		Help screen in 4 languages. One-touch settings. Registration memory. Sliding key cover	Mic input through reverb. Custom rhythm programmer. Sliding key cover	Programmable organ drawbar settings and percussion. Realtime effects control. 24 performance memories

Yamaha P500, P300	Yamaha PDP400	Yamaha PF 85	Yamaha YPP-15	Yamaha YPP-50	Yamaha YPP-55, YPP-35
P500: $8,265; P300 $3,395	$4,875	$1,495	$499.95	$999.95	YPP-55: $1,195.95; YPP-35: $699.95
88/counter-balanced	88/counter-balanced	88/counter-balanced	61/weighted	76/weighted	55: 76; 35: 61/ weighted
pb, mod, 2 assignable sliders	pb, mod	—	—	—	—
32/2	32/16	16/—	28/—	8/—	32/—
4 ac p, 5 elec p, clav, Clavinovatone	6 ac p, 6 elec p, 1 ht p, 2 hpsch, 4 elec org, 3 p org, 2 vib, 2 mba, 12 bs, 40 other/GM	2 ac p, 1 elec p, 1 hpsch, 1 vib	2 ac p, 2 elec p, 1 p org, 1 hpsch, 1 vib, 1 str, 1 choir	1 ac p, 1 elec p, 1 hpsch, 1 vib, 1 str, 1 bass, 1 brass	2 ac p, 1 elec p, 1 p org, 1 hpsch, 1 vib, 1 str, 1 choir
split, trans, layer, 20 vc	split, trans, layer, 3 vc	—	—	—	—
4 sim, 38	4	1	—	—	1
—	24	—	—	—	—
—	4/4, 1-finger	—	—	—	—
none	SMF, Dsklv, DOC/DOC	none	none	none	none
yes	—	—	—	—	—
—	11/???/???/0, quan, save, metro	—	—	1/—/—/—, metro	1/—/—/—, metro
Backlit LCD, 40 ch x 2 line; 2 ch LED	LED	—	—	LED	LED
P500: sust, sost, soft; jacks: programmable foot controller; P300: sust; jacks: sost,, soft, programmable foot controller	sust	sust	sust	sust	sust
P300 only: 2 x 20W, 2 x 5 1/8"	2 x 20W, 2 x 5"	2 x 20W, 2 x 5-1/2"	1 x 5W, 2 x 4-1/4"	2 x 5W, 2 x 6-1/4"	2 x 5W, 2 x 4-v100 3/4"
P500: Out: 2 x balanced XLR, 2 x 1/4", 1 x 1/4" hph; P300: In: 2 x 1/4"; Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 1 x 1/4", 1 x 1/4" hph	In: 1 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	Out: 2 x 1/4", 2 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph	Out: 2 x 1/4", 2 x 1/4" hph
P500: mahogany veneer case/stand; P300: black case	Black plastic case	Black case	Black plastic case	Black plastic case	Black plastic case
P500: 121 lbs, 57-3/8" x 21-5/8" x 30-1/2"; P300: 83 lbs, 11 oz, 54-1/2" x 16-3/4" x 6-7/8"	87 lbs, 54" x 17" x 7"	71 lbs, 52-3/8" x 15-3/8" x 5-5/8"	16 lbs, 8 oz, 38-5/16" x 15" x 4-27/32"	29 lbs, 45-1/2" x 16-1/4" x 5-1/2"	YPP-55: 29 lbs, 47" x 16-1/4" x 5-1/4"; YPP-35: 20 lbs, 38-3/16" x 15" x 4-27/32"
Programmable stretch tuning and micro tuning. Realtime effects control. 32 performance memories					

Manufacturer contact list on page 162

◄ Continued from page 69

Polyphony/Multitimbral Parts. The first figure indicates the maximum number of notes an instrument can produce at a time, even if you lay a two-by-four across the keys. The second tells you how many different sounds it can play at a time. This ranges from layering two sounds across the whole keyboard to having up to 16 instruments playing via MIDI or an internal sequencer.

Number & Type of Sounds. For the digital pianos, we've tried to spell out exactly how many sounds in the common categories an instrument has. If at least the main piano samples are in stereo, you'll see that indicated here. If an instrument has the complete General MIDI set of 128 sounds, *GM* will appear in this row.

Keyboard Modes. If you can have different sounds on different parts of the keyboard, *split* will appear here. If you can transpose each split independently, *trans* will be indicated. Velocity curves change how sounds respond to how hard you strike a key; *vc* denotes this ability and the number of different curves available.

Auto-Accompaniment Styles. This is a breakdown of the styles of music that are pre-programmed into an auto-accompaniment keyboard.

Patterns. Indicating maximum figures only, this is the number of variations, fills, intros, endings, and other patterns available within a single style. The second figure is the maximum number of accompanying instruments you will hear for a given style. *1-finger* indicates that the keyboard will change chord types depending on the finger or combination of fingers you hold down on a specific area of the keyboard. *User-rec* indicates that you can create your own style patterns, and *user-save* tells you that the instrument will remember them. If you can change the MIDI channels of accompaniment parts, *MIDI edit* appears here.

Disk Drive. The Standard MIDI File format (SMF) allows sequences created on one SMF-compatible sequencer to be stored on a 3-1/2" floppy disk and subsequently read and played on another, including those with disk drives on digital pianos and portable keyboards. Some manufacturers have their own proprietary sequence formats; if a disk drive reads and writes them, these are spelled out here as well.

Memory. Separate from disk drives, this indicates the ability to access additional sounds or sequences from a memory card or cartridge inserted into the instrument. "Yes" indicates that whatever front-panel settings you make before you turn off the instrument will reappear when you turn the instrument on.

Sequencer. Many digital pianos and portable keyboards have built-in sequencers, some as simple as a single-track recorder that can hold a couple thousand notes to full-blown 16-track models. Data is listed in this order: number of tracks, maximum number of events, clock resolution in ppq, and number of songs that can be stored in internal memory. Following that, you may find that the instrument has a *quantization* feature for correcting rhythm, a *punch-in* and *punch-out* ability to re-record specific sections, the capability to *save* songs to a disk drive, or a *metronome* feature.

Display. Light-emitting diodes (LED) and liquid-crystal displays (LCD) are common. The question is one of size, which in this case will be expressed in the number of characters and lines that can be shown, or in pixels, if the display is graphic.

Pedals. This shows which pedals are supplied with an instrument. If there are jacks on the rear panel but pedals are not supplied, we've indicated the functions they perform.

Amplifier & Speakers. Most instruments have two or more speakers in a stereo configuration; the power is expressed in watts per channel.

Audio In/Out. The number of headphone jacks (always a stereo connection), and the number and type of audio outputs are indicated here. If an instrument accepts external signals such as a microphone or CD player, *in* and *out* connectors will be listed separately.

Cabinet, Stand, & Bench. This is not an issue for portable keyboards, but it takes up a lot of real estate in the digital piano chart. If an instrument comes with a *stand* or *bench*, these words will appear after the types of finish. If it's a *console* or *grand*, it won't need a stand.

Weight & Dimensions. Dimensions are listed width first, depth from the keyboard to the back second, and height from the floor to the top last.

Other. Miscellaneous or unique features that didn't fit neatly into another category are listed here, as is optional equipment. ■

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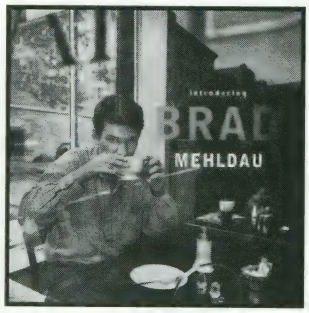

Which brings us to...

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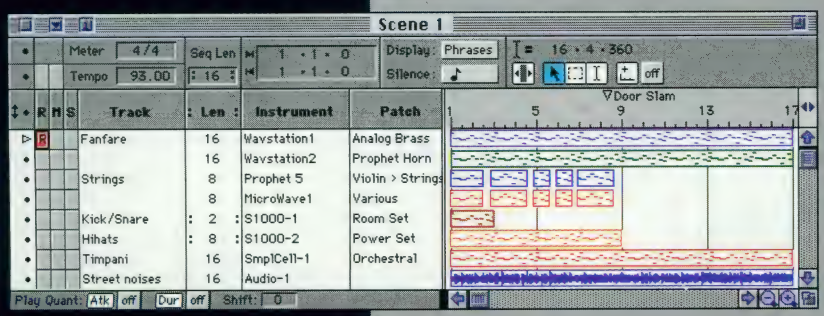

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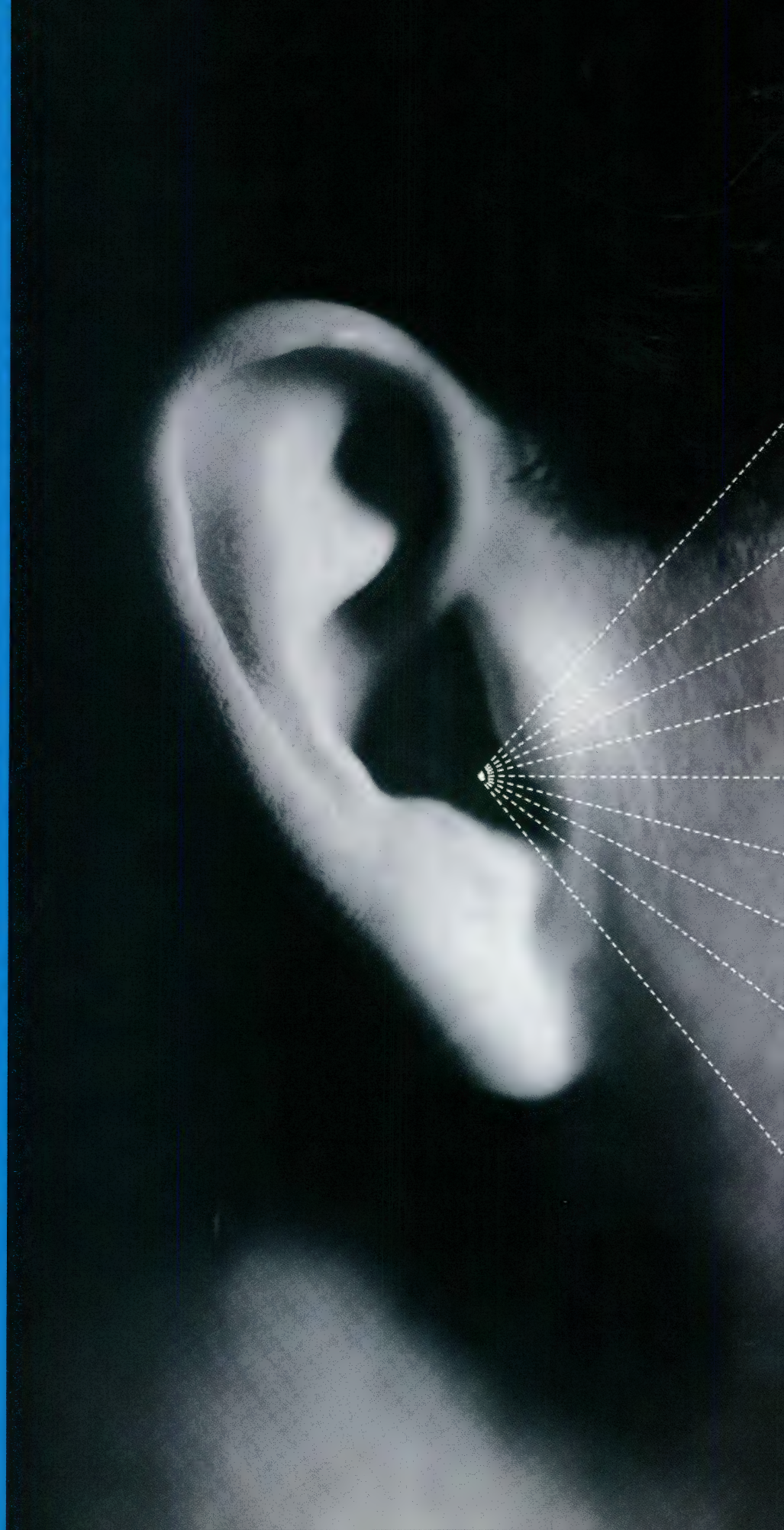

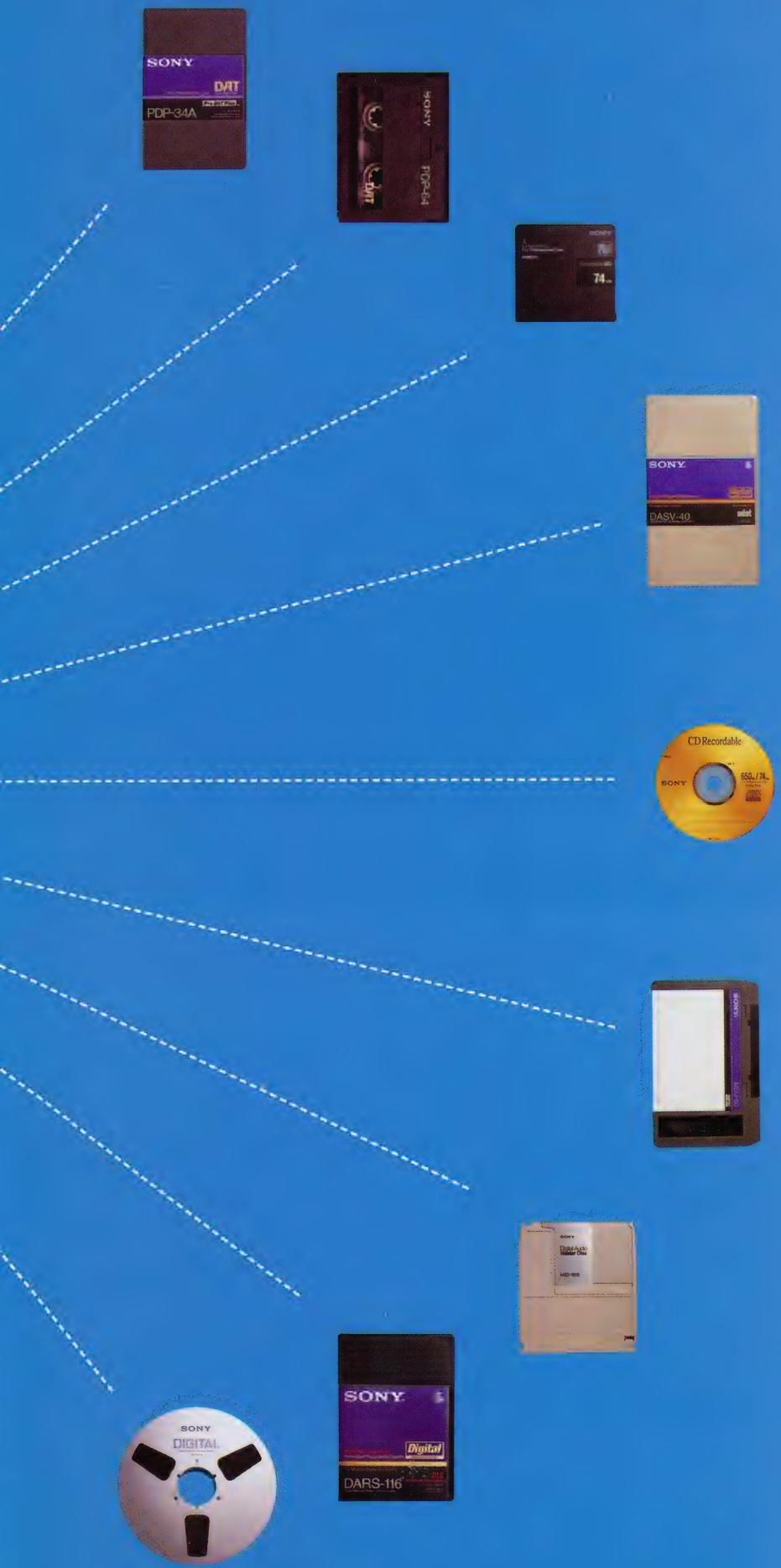

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CIRCLE READER SERVICE # 132

BUYER'S GUIDE

Digital ORGANS

B-3 PRETENDERS

BY **MARK VAIL**

For 40 years, roadies (and organists who couldn't afford roadies) have lugged brutally heavy Hammond organs and their companion Leslie speaker cabinets from one gig to the next, suffering back and hernia problems in the process. Today, there are numerous alternatives that, while they don't perfectly duplicate the B-3's sound nor the experience of sitting or standing at its imposing console, do an impressive and convincing (to the typical listener) job of standing in for the King of Vintage Organs. In some cases, benefits offered by the current crop of organs — programmability, MIDI, etc. — might counterbalance the thrill and effectiveness of playing the real thing. Not included in this chart (so that it wouldn't fill the entire Buyer's Guide) were organs with auto-accompaniment functions.

So what's available in the B-3 wannabe world? The following chart presents intricate data on currently available organs, both keyboard-based and modules. For more insight and actual hands-on descriptions of most of the products mentioned here, see the roundup conducted in the Sept. '95 *Keyboard*. Now, a few words of clarification about the chart.

Not every current organ offers stereo outputs. In the **1/4" output** row, we define the number of outputs, whether the output signal is stereo (just because an organ has two outs isn't a guarantee of stereo signal), and whether a headphone jack is provided. As far as we're aware, headphone outs on stereo organs are also stereo; they're mono on mono organs.

Velocity response would seem alien to most organ players, but a few instruments here provide it — for MIDI transmission and/or some type of internal voice response, such as the percussion volume. Ditto for channel aftertouch. You'll find this information in the **voice response** line.

Likewise, **performance controls** such as drawbars — if they're present — are handled in different ways. On organs with drawbars, the internally generated timbre can be altered as notes are playing by adjusting drawbar positions. Until recently, this capability wasn't supported by some digital organs. The **foot controller** line indicates whether an organ can accommodate a footswitch and/or a pedal and what type of MIDI data, if any, is transmitted in association with their use. Whether the drawbars and other controllers transmit data via the MIDI out is another question. If data *is* transmitted, it will be one of two varieties: continuous controller or system-exclusive. The former is easier to deal with in a MIDI sequencing environment. To find out how an organ deals with its performance controls, inspect the **controls affect int/MIDI** row.

Further down the chart, you'll discover whether an organ responds to incoming **MIDI program changes** and if it lets you **remap** program changes to call up organ patches of your choice. If an organ supports **MIDI overflow**, notes that exceed the instrument's polyphonic limit will be routed to the MIDI out rather than stealing notes that are already sounding. Multitimbral organs — those that allow different organ sounds to be played over different MIDI channels — may provide **dynamic voice allocation**, which means voices are freely shared and stolen when needed among the channels, and **voice reserve**, which allows you to specify a polyphonic limit for any channel.

ABBREVIATIONS

—: not applicable. **???**: information not available. **CAT**: aftertouch. **cc**: MIDI continuous controller data. **ch**: channel. **ctrl**: controller. **dest**: destinations. **dist**: distortion. **dwbr**: drawbar. **dyn**: dynamic. **env**: envelope. **EQ**: equalization. **exp**: expansion. **expr**: expression. **ext**: external. **FP**: front panel. **freq**: frequency. **ftpd**: foot pedal. **ftsw**: footswitch. **FX**: effects. **GM**: General MIDI. **hdwr**: hardware. **hdph**: headphone jack. **HF**: high frequency. **HP**: highpass. **Hz**: hertz. **I/O**: input & output. **inc/dec**: increment/decrement. **ind**: individual. **int**: internal voices. **kbd**: keyboard. **kHz**: kiloHertz (thousand). **KP**: key position. **LCD**: liquid-crystal display. **LED**: light-emitting diode. **Leslie**: rotating speaker simulation. **LF**: low frequency. **LP**: lowpass. **LR**: Leslie simulation low rotor. **max**: maximum. **mem**: memory. **mod**: modulation. **OD**: overdrive. **op sys**: operating system. **param**: parameter. **PB**: pitch-bend. **pdlbrd**: pedalboard. **pdl**: pedal. **perc**: percussion. **pgm**: program. **pos**: position. **prog**: programmable. **reg**: registration. **regen**: reverb regeneration level. **rev**: reverb. **RT**: real-time. **RV**: release velocity. **sec**: seconds. **seg**: segment. **sim**: simulation. **simul**: simultaneous. **spd**: speed. **sus**: sustain. **sw**: switch. **tog**: toggle. **trns**: transmission. **TRS**: tip/ring/sleeve. **unbal**: unbalanced. **UR**: Leslie simulation upper rotor. **V**: velocity. **vib**: vibrato. **vol**: volume.

	Hammond Suzuki XB-2 version 2	Hammond Suzuki XB-3/XC-3	Hammond Suzuki XB-5
suggested retail price	$2,195	under $20,000 for XB-3 console pkg & Leslie 122XB	$6,750, $10,000 for console pkg
optional add-ons	expr pdl, ftsw	ftsw	expr pdl, ftsw, base, 13- or 25-note pdlbrds, bench
module or keyboard/keys	kbd/61	kbd/dual 61-note manuals, 25-note pdlbrd	kbd/dual 61-note manuals
current operating system	2.01	2.02	2.00
display(s)	16-char x 2-line backlit LCD & LEDs	20-char x 2-line backlit LCD & preset LEDs	20-char x 2-line backlit LCD, LEDs
1/4" outs/stereo/headphone jack	2 + 11-pin Leslie out + FX loop/ yes/yes	3 + 11-pin Leslie out/yes/yes	2 + 11-pin Leslie out + FX loop/ yes/yes
dimensions (W x D x H), weight	45-3/4" x 12-1/4" x 4-1/3", 30 lbs	50-3/4" x 38-3/4" x 47-1/2", 165 lbs (XB-3), 215 lbs (XC-3)	44-7/8" x 19-1/4" x 7-1/4", 64 lbs
voice response	notes, V (perc & MIDI out), KP (perc)	notes, V (perc & MIDI out), CAT, KP (perc)	notes, V (perc & MIDI out), KP (perc)
in/out split zones	1/4	1/12	1/6
performance controls	9 dwbrs; 2 perc, Leslie spd, vib, MIDI trns off, & mem buttons; vol, rev level, 2-band EQ, & LCD contrast knobs; PB & mod wheels	4 sets of 9 manual dwbrs, 2 pdlbrd dwbrs; 2-band EQ, rev, OD, input vol, & total vol knobs; 2 harmonic buttons; decay, perc, & MIDI trns off buttons; PB & mod wheels; Leslie spd sw	2 sets of 9 manual dwbrs, 2 pdlbrd dwbrs; 2-band EQ, rev, OD, input vol, total vol, & LCD contrast knobs; 2 harmonic buttons; decay, perc, & 3 MIDI trns off buttons; PB & mod wheels; Leslie spd sw
foot controls	ftsw & ftpd/cc	ftsw & ftpd/cc	ftsw & ftpd/cc
controls affect int voice/MIDI	both	both	both
MIDI data transmit by dwbrs/ctrls	cc	cc	cc
maximum polyphony	16	16	16
synthesis method	sample playback	sample playback	sample playback
front panel prog/real-time dwbrs	yes/yes	yes/yes	yes/yes
ROM/RAM pgms	none/128	none/26 (12 per manual, 2 pdlbrd)	none/9
program parameters	dwbr voicing, attack, perc, sus length, kbd split, foldback	dwbr voicing, attack, perc, sus length, kbd split, foldback	dwbr voicing, attack, perc, sus length, kbd split, foldback
waveform ROM	4Mb	4Mb	4Mb
organ simulations	Hammond	Hammond	Hammond
non-organ sounds	none	none	none
types of effects	rev, vib & chorus, OD, sustain, Leslie	rev, vib & chorus, tube OD, sustain	rev, vib & chorus, OD, sustain, Leslie
chorus, trem, & Leslie available simul	no	—	no
stereo effects	yes	yes	yes
types of reverb	room, live, hall, church	room, live, hall, church	room, live, hall, church
reverb prog or preset	preset	preset	preset
editable reverb parameters	rev type	rev type	rev type
maximum reverb decay time	2 sec	2 sec	2 sec
editable Leslie parameters	slow & fast speeds, rise & fall times	—	slow & fast speeds, rise & fall times
Leslie speed ctrl	ftsw, FP button	FP button, ftsw, mod wheel, CAT	ftsw, FP button
MIDI connectors	in, out, thru	in, out, thru	in, out, thru
pgm chg response/mapping	yes/no	yes/no	yes/no
MIDI overflow	no	no	no
bulk mem dump	all data, ind pgms	all data, ind pgms	all data, ind pgms
simul MIDI channels (transmit/receive)	2/4	3/12	3/6
keyboard zones per pgm	4	4 per manual	2 per manual
dynamic voice allocation	yes	yes	yes
voice reserve	no	no	no
Keyboard Report	ver 1, Nov. '91; ver 2, Sept. '95	July '94	Oct. '93

Oberheim OB-3	Oberheim OB-3[2]	Peavey Spectrum Organ	Rodgers W-5000
$799	$1,295	$399.99	???
none	none	PC 1600: $349.99	custom speaker configs inc rotary cabinets
tabletop mod/—	tabletop mod/—	rackmount mod/—	kbd/61- & 76-note manuals, 25-note pdlbrd
???	???	1.2	1.9
LEDs	LEDs	3-char LED	16-char x 2-line backlit LCD
1/no/yes	2/yes/yes	2/yes/no	10/yes/yes
11-1/2" x 11-1/2" x 3-1/2", 9-1/2 lbs	12-1/2" x 12" x 3-1/2", 7-3/4 lbs	19" x 7-1/2" x 1-3/4", 5-1/4 lbs	51-1/2" x 38-1/2" x 54-1/2", 460 lbs
notes 36-96	notes	notes, V, CAT	notes, V, RV, CAT
1/—	3/—	4/—	5/6
9 dwbrs; 6 preset, dwbr, 4 perc (2nd, 3rd, fast/slow, & loud/soft), key click, 3 vib, 2 Leslie, & MIDI ch buttons; vol & OD knobs	9 drwbrs, 22 buttons, 7 knobs, pitch screw	none; RT & editing functions provided by PC 1600's sliders & buttons	PB & mod wheels, 2 vol knobs, 8 vol sliders, 26 dwbrs, 16 edit buttons, 80 voice buttons, 13 pistons
2 ftsw: Leslie spd & reg tog; ftpd: expr	2 ftsw: Leslie spd, reg tog; ftpd: expr	ftsw: Leslie spd; ftpd: volume	expr pdl w/ 2 kick ftsws, 2 ftpd ins, selectable bass pedals, 2 user dwbrs
int only	both	both	both
none	system-exclusive	system-exclusive (PC 1600 required)	cc
8	24	32	256
analog	sample playback	sample playback	sample playback
no/yes	yes/yes	no/yes (PC 1600 required)	yes/yes
6/—	6/7	128/none	900/none
—	perc 2nd, 3rd, soft/loud, slow/fast, bass, treble, OD, vol, FX select & amount, vib/chorus to each manual	all via sys-ex (PC 1600 or editor required); edits aren't storable in unit	key click level & time, rev, chorus, vib, dist, Leslie, perc time, mode, & recover, dwbr level & mellow/bright
—	???	1Mb	???
Hammond	Hammond	Hammond B-3, Farfisa, Vox, pipe	Hammond B-3, pipe
none	none	none	654 synth voices
Leslie, vib, OD	digital rev, delay, chorus, vib, Leslie, OD	vib/chorus, OD, speaker sim, Leslie, reverb	rev, chorus, tremolo, Leslie, dist
vib & Leslie	yes	yes	yes
no	yes	yes	yes
none	spring, plate, hall, stage, tape delay	hall	room, hall, plate, delay, panning delay
—	prog via MIDI only	10 presets	prog
—	all via sys-ex, regen via cc	all via sys-ex	level, filter, time, feedback, chorus send
—	???	5 sec	???
—	via MIDI: HR fast & slow spds, slow-to-fast & fast-to-slow times; ditto for LR	10 presets	ctrl, tweeter & woofer levels, separation, woofer mod depth, dry send off/on, FX send, out level, mellow/bright, rise & fall times, slow & fast spds
ftsw or button	ftsw, button	ftsw, mod wheel	ftsw, button, level, wheel, CAT
in, thru	in, out, thru	in, out, thru	in & out 1, thru, in 2, out 2
0-6/no	yes/no	yes/no	yes/yes
no	no	yes	no
no	all data, ind pgms	no	no
—/1	—/3	—/4	16/16
1	3	4	???
—	no	yes	yes
—	no	no	yes
Sept. '95; Viscount D9e, Jan. '93	—	Sept. '95	—

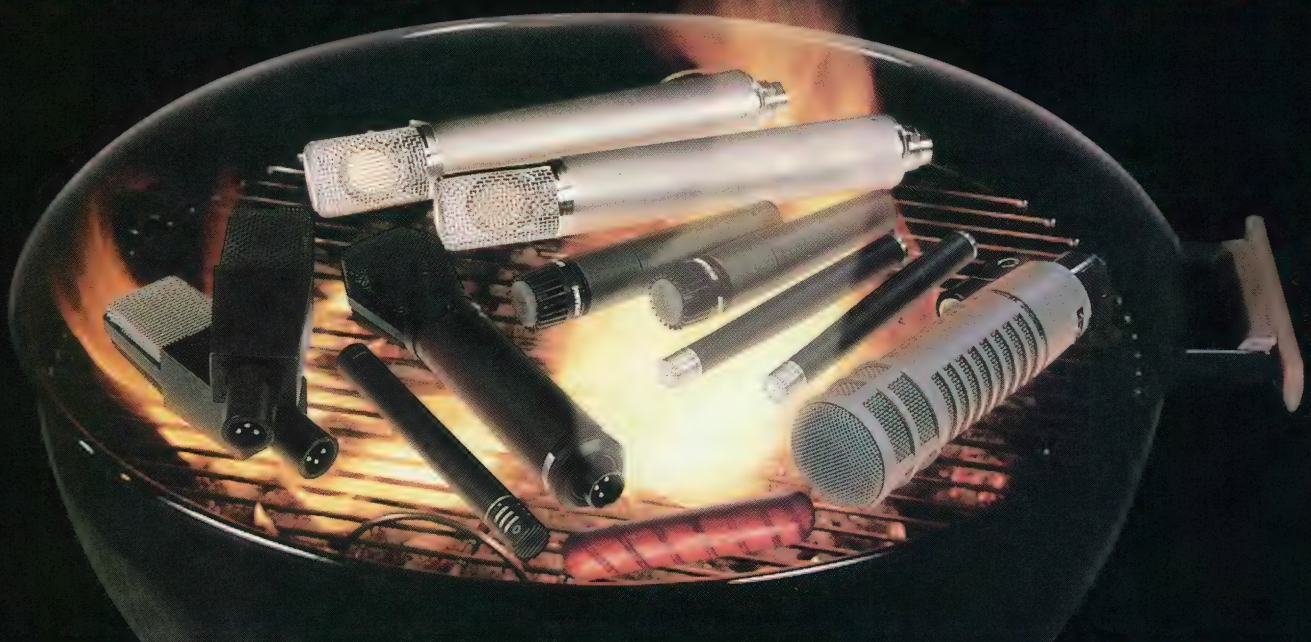
Manufacturers contact list on page 162

Organs/Organ Modules

	Roland/Rodgers W-50	Viscount D9	Voce Micro B II	Voce V3
suggested retail price	$2,995	$1,295	$579	$1,195
optional add-ons	none	none	none	MIDI Drawbar, $299
module or keyboard/keys	kbd/61	kbd/61	mod/—	mod/—
current operating system	1.10	2.0	V1.2	2.0
display(s)	16-char x 2-line backlit LCD	LEDs	LEDs	16-char x 2-line backlit LCD, LEDs
1/4" outs/stereo/headphone jack	2/yes/yes	1/no/yes	2/yes/yes	2/yes/yes
dimensions (W x D x H), weight	39-13/16" x 11-7/16" x 3-5/8", 14 lbs 9 oz	46" x 13" x 4-1/2", 29 lbs	8" x 9" x 1-3/4", 4 lbs	19" x 9" x 1-3/4", 7 lbs
voice response	notes, V, CAT	notes	notes & vol	notes, V (perc), CAT
in/out split zones	1/2	2/2	1/—	1/—
performance controls	vol slider, 4 voicing/editing sliders, PB & mod wheels, 72 buttons	9 dwbrs; 6 preset, dwbr, 4 perc (2nd, 3rd, fast/slow, & loud/soft), key click, 3 vib, 2 Leslie, & MIDI ch buttons; vol & OD knobs	vol, OD, key click, & perc vol knobs; rotary preset & FX switches; perc decay & harmonic buttons; soft/hard key click button	OD, perc vol, decay time, on/off, 2nd/3rd harmonic, Leslie on/off, fast/slow, brake, vib/chorus on/off, select
foot controls	1 ftsw: hold	2 ftsw: Leslie spd & reg tog; ftpd: expr	ftsw: Leslie spd	ftsw: Leslie spd, brake; ftpd: expr
controls affect int/MIDI	both	int	int	int
MIDI data transmit by dwbrs/ctrls	cc	none	—	cc (MIDI Drawbar required)
maximum polyphony	56	8	32	full
synthesis method	sample playback	sample playback	digital oscillator	digital oscillator
front panel prog/real-time dwbrs	yes/yes	no/yes	preset/no	yes/yes
ROM/RAM pgms	242/256	6/—	36/—	none/128
program parameters	resonance, filter cutoff, attack, decay, release, vib depth & delay	—	—	dwbr setting, aux dwbr setting, organ type, generator leakage, low octave foldback, bass & treble EQ, OD mix, key click level, perc, etc.
waveform ROM	???	—	—	—
organ simulations	Hammond B-3, pipe	Hammond B-3	Hammond B-3, Farfisa, Vox Continental	Hammond B-3, Farfisa, Vox Continental
non-organ sounds	226 GM/GS tones	none	none	none
types of effects	chorus, rev, pan	Leslie, vib, OD	chorus, Leslie, vib	chorus, vib, Leslie, dist
chorus, trem, & Leslie available simul	chorus/vib	vib & Leslie	chorus/vib + Leslie	chorus/vib & Leslie
stereo effects	yes	no	yes	yes
types of reverb	room, hall, plate, delay, panning delay, stage	none	none	none
reverb prog or preset	prog	—	—	—
editable reverb params	level, time, feedback	—	—	—
maximum reverb decay time	???	—	—	—
editable Leslie parameters	none	—	UR & LR fast, slow, acceleration, & mic distance via MIDI	UR fast, slow, acceleration, deceleration, brake rate, & mic angle; ditto for LR
Leslie speed ctrl	no	ftsw or button	ftsw or button	ftsw, button, CAT
MIDI connectors	in, out 1 & 2	in, out	in, thru	in, out, thru
pgm chg response/mapping	yes/no	yes/no	yes/no	yes/no
MIDI overflow	???	no	no	no
bulk mem dump	all data, ind pgms	no	no	all data, ind pgms
simul MIDI channels (transmit/receive)	16/16	2/2	—/3	—/3
keyboard zones per pgm	1	1	2	2
dynamic voice allocation	no	no	yes	—
voice reserve	yes	no	no	—
Keyboard Report	—	Sept. '95; Viscount D9e, Jan. '93	Sept. '95; Micro B, Aug. '93	Sept. '95

Manufacturers contact list on page 162

ART GIVES YOU A MUCH BETTER WAY TO WARM THE SOUND OF YOUR MICS!



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- 70DB OF GAIN
- HAND-SELECTED 12AX7 TUBE
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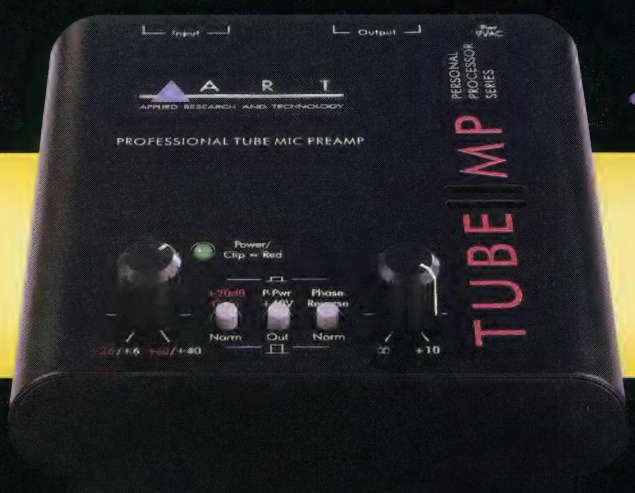

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CIRCLE READER SERVICE # 133

◄ Continued from page 65

their limitations. They have them. My question is, why do we always focus on the limitations and not the possibilities?

Deity2
via Internet

Why restrict the field of "Sounds that Must Die" [Oct. '95] to just keyboard sounds? Here are some other sounds that are overused: (1) Noisy, distorted guitars. (2) Overly processed studio drums. (3) Acoustic guitars and anything else that jangles. (4) Natural-sounding bass guitars. (5) Vocalists who whine, scream, or croon. (6) Kazoo solos (I know, not overused, but very annoying).

ExSinnical
via Internet

I found "20 Sounds that Must Die" largely pointless. It seemed to miss the point of *why* so many sounds these days are overused. I agree there is often little imagination or creative energy put into sounds and songs; I also agree that "[t]imbre is as fundamental as melody, harmony, or rhythm to electronic music." But where does the problem originate? I find no inspiration in the digital synthesizers that dominate the marketplace. While most of these instruments do contain enormous computing/synthesis power, their awkward interfaces prohibit real hands-on tweaking and exploration — hence the prevalent reliance on presets, factory samples, and sample CDs. Their minuscule displays and sparse controls alienate the synthesist, preventing any real interactive relationship with the sound. The only inspiration I've found in a long time comes from vintage and newly re-emerging analog units.

Jeffrey Melton
via Internet

"20 Sounds that Must Die" was a waste of paper. Many of your readers probably own those synths and like the patches that you dumped on. You insulted them, and for what purpose? For another thing, according to the logic of the article, just about all acoustic instruments should be thrown out the window, simply because their timbres have been used in music so often. That's ridiculous, of course, so why try to apply that logic to synthesizers?

If a sound is used often, it must be because people like it. What's wrong with that?

The article's attitude buys into the concept of planned obsolescence. Because new synths keep coming out all the time, you could fall prey to the idea that what's new is great, and therefore what's old must be no good anymore. I can understand synth manufacturers trying to promote that attitude, but not *Keyboard*.

Richard Whitehouse
via Internet

The fact that an article like "20 Sounds that Must Die" crossed your pages is indictment enough of the current state of our musical mentality. I take offense, however, at the remarks made about the DX7. The DX7 is clearly the most important synthesizer and instrument of modern times. People who don't recognize this are not programmers, but merely people (not musicians) who bought, traded, or stole the most commonly used DX7 sounds.

Plex Barnhart
New York, NY

There's only one thing I can think of that's more annoying than using an often-heard factory synth patch: *not* using it just because another musician might recognize it.

Mike Renneker
Van Nuys, CA

I want to respond to your list of "Top Synth Hits" [Sept. '95]. Some of the selections (and particularly omissions) were surprising. These titles deserved serious consideration as "Top Synth Hits": Elton John's "Funeral for a Friend" (with Dave Hentschel's great Moog work), Yes's "Roundabout," Heart's "Magic Man,"

Continued on page 171 ►

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CIRCLE READER SERVICE # 134

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For example, the CR-1604 has less microphone preamps than its competition. That's because we correctly assumed that most mixer users would get more benefit out of 6 low noise, studio-grade preamps than out of 16 cheaper ones. If you DO need a total of 16 ultra-wide-bandwidth, high-headroom preamps, simply add our XLR10 Mic Preamp Expander.

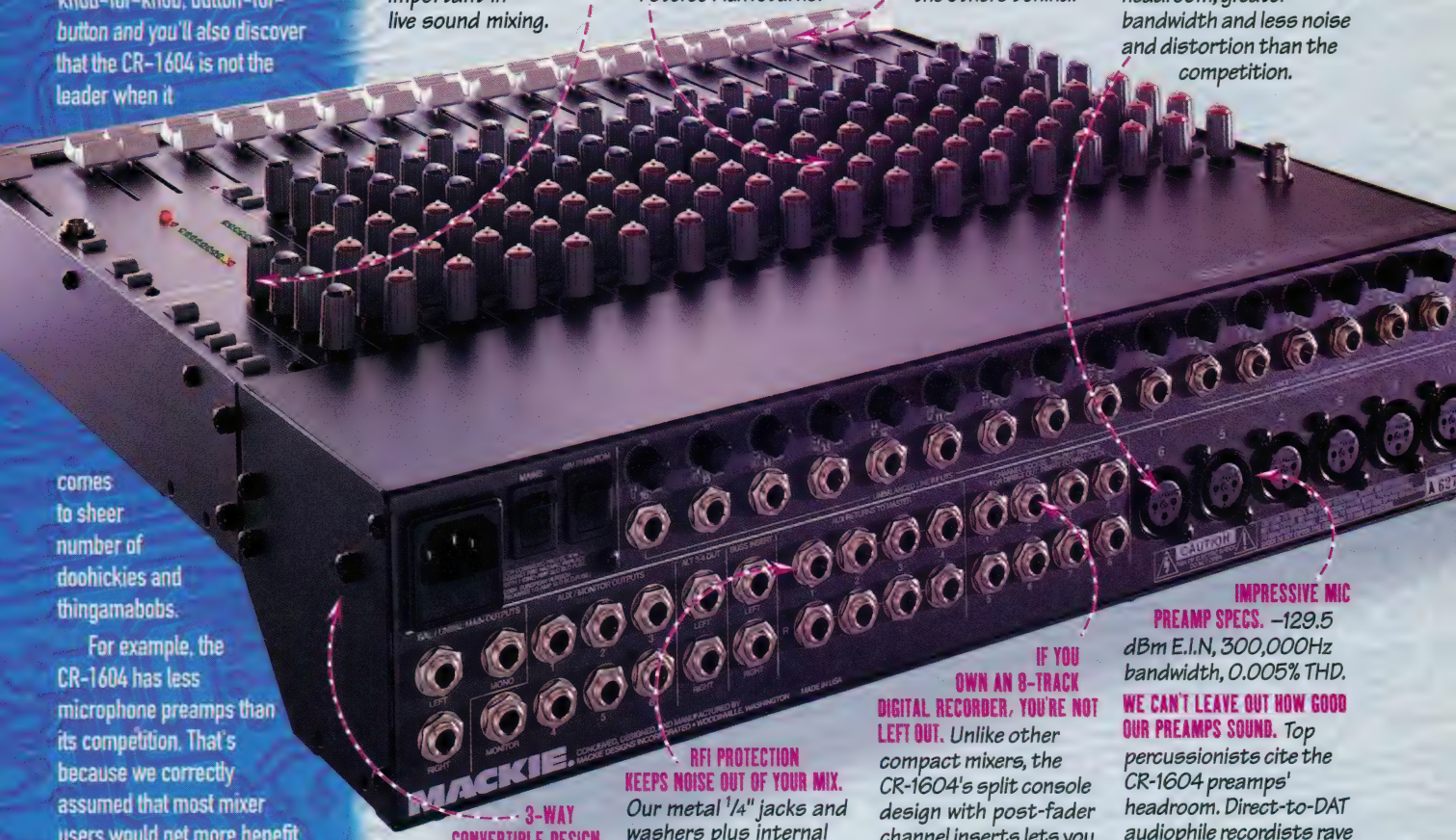
Quality over quantity... that's the CR-1604 design philosophy. Yet it seems to have enough of something. Because the CR-1604 has mixed and tracked more CDs, more commercials, more TV program music — and more feature film soundtracks — than any other compact mixer, period.

110dB INTERNAL DYNAMIC RANGE. *That's 19 times more dynamic range than the 90dB range of a compact disc! This is especially important in live sound mixing.*

WE LEFT OUT COMPLICATED INTERFACES. *You have instant, hands-on access to 3-band EQ, constant-power pan, 7 Aux sends per ch. and 4 stereo Aux returns.*

ULTRA-LOW NOISE. *When you compare noise specs, look for the test that counts: all 16 channels at Unity Gain. The Mackie CR-1604 leaves the others behind.*

WE LEFT OUT 10 MIC PREAMPS! *Instead of sixteen "acceptable" microphone preamps, the CR-1604 features six big-console-quality preamps, more headroom, greater bandwidth and less noise and distortion than the competition.*



IMPRESSIVE MIC PREAMP SPECS. *–129.5 dBm E.I.N, 300,000Hz bandwidth, 0.005% THD.*

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CIRCLE READER SERVICE # 135

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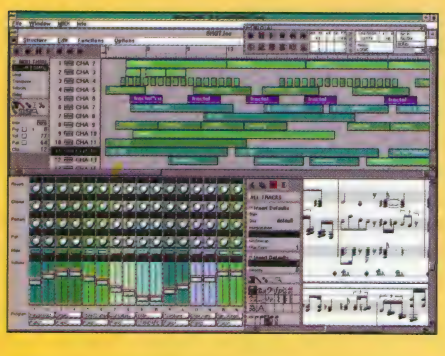

and effects. User definable color coding for all tracks and a powerful interactive notation section provide maximum overview and easy handling. Should you one day desire more functionality and power, you can simply upgrade to Logic.

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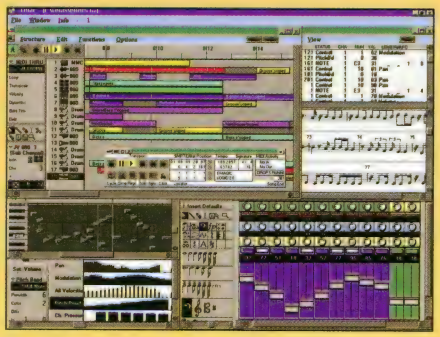

perfect tool for producing music in professional or home studio environments. Logic for Windows (also available for Macintosh) will offer you entirely new possibilities and its flexibility will amaze you again and again.

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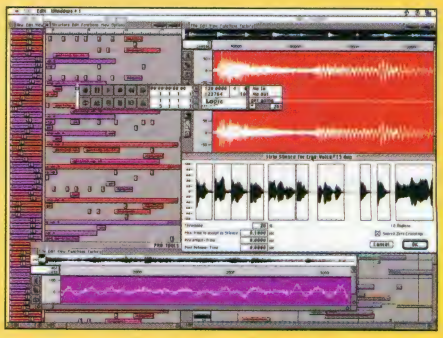
The add-on integrated module that turns Logic into a total digital studio!

Install the Logic Audio Module with Logic on your Mac/Power PC, and all doors to the exciting world of digital audio recording will swing wide open. You can use the Apple Sound Manager to record* and play up to 12 tracks or use any of the audio hardware options from Digidesign (4-48 tracks**). Arrange MIDI and audio tracks on one surface, edit the pitch and length of a digital audio track in one process, adapt the groove of your MIDI tracks to the groove of an audio track, turn monophonic digital



recordings into printed score and enjoy what many users say is the best music program ever made.

The Logic Windows Audio Module is scheduled for Q1/96

* *16 bit Audio-in Mac only*

** *16-48 tracks using TDM Extension*

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Jewels. The Logic System.

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The Logic TDM Extension will make your Pro Tools III a total state of the art Digital Audio Workstation!

In combination with Digidesign's Pro Tools III system and Logic Audio, the TDM Extension allows for 16 - 48 digital audio tracks. Thanks to a special Audio Object in Logic's Environment you can create virtually any Pro Tools mixing desk that you may need. All Plug-Ins (digital effects) can be fully automated including Aux Sends and Master Outputs. Plug-Ins can also be inserted and deleted during playback and every possible TDM configuration can be saved

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the Time Machine™, the Quantize Engine™, the Silencer™, the Groove Machine™ , the Audio Energizer™, the Audio to Score Streamer™, Audio to MIDI Groove Templates™ and more. You owe it to yourself to seriously check out this program before you consider buying anything else.

*** 16-48 tracks using TDM Extension*

CBX Extension

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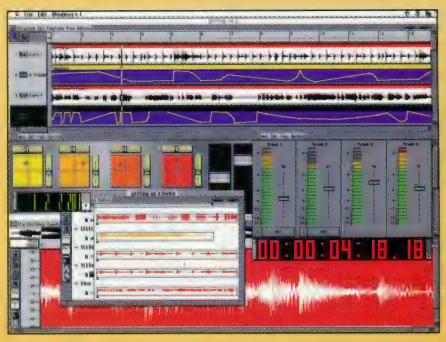

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CIRCLE READER SERVICE # 136

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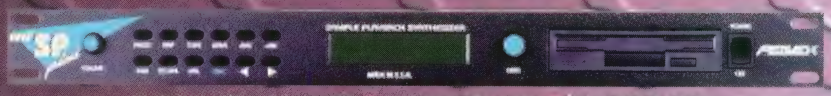

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CIRCLE READER SERVICE # 137

BUYER'S GUIDE

Portable Keyboards

BY **ERNIE RIDEOUT**

ABBREVIATIONS

ac p ..... acoustic piano
bs ..... bass
cd ..... Generalmusic CD format
chd ..... chords
clav ..... clavinet
DOC ..... Disc Orchestra Collection
Dsklv ..... Yamaha Disklavier
d kit ..... drum kit
elec p ..... electric piano
elec org ..... electronic organ
hpsch ..... harpsichord
hph ..... headphone
ht p ..... honky-tonk piano
ism ..... Roland ism
lyr ..... lyrics
mba ..... marimba
mel ..... melody
metro ..... metronome
MIDI edit ..... MIDI tx channel of parts editable
mod ..... modulation wheel
1-finger ..... one-finger or "easy-play" chords
patsw ..... pattern switch
pd ..... PianoDisc
p org ..... pipe organ
pb ..... pitch-bend
punch ..... punch-in/out
quan ..... quantization
save ..... save songs to floppy disk
strt/stp ..... seq start/stop
sim ..... simultaneous
SMF ..... Standard MIDI File on DOS disk
sost ..... sostenuto
str ..... strings
sust ..... sustain
tnsps ..... transpose per split
user-save ..... user styles saved in memory
user-rec ..... user-recordable styles
vc ..... velocity curves, number
vib ..... vibes
vol ..... volume
WS ..... Wurlitzer Song format
WX ..... Wurlitzer sequence format

Once eschewed by professional musicians for their cheesiness, portable keyboards have made significant strides in the past decade. High-quality sampled sounds are now standard, and rhythm accompaniment patterns are often programmed by professional musicians known for their work in the requisite styles. Some instruments have sequencing functions that rival the computer-based programs used in pro studios. They've become more than just portable keyboards: They're recording studios staffed by tireless, uncomplaining session cats with all the right instruments for the gig, just itching to go out on the road with you.

Besides the pro units loaded with bells and whistles, you'll find many reasonably-priced instruments for someone who is just starting out and has an interest in music. A couple of them even have special learning aids, such as a song library with right and left-hand parts that can be muted, or LEDs that light up over the appropriate keys to play.

Speaking of songs, portable keyboards are great tools for songwriting on the road. Hotel rooms, busses, and airport waiting rooms no longer need to be holes into which you pour unusable time. Got a great idea for yet another song about how tough it is to be a touring musician? Whip out a demo before breakfast, play it for the band on the bus, run it down at soundcheck, and have the audience in tears that night.

Portable keyboards are about as self-contained as an electronic instrument could be. Small or large, amplifiers and speakers are built-in. For the most part, these are for the listening pleasure of the performer; audio outputs are provided on models that are designed for performing in large spaces. Many instruments can be powered by batteries as well as AC.

Nearly all of the following instruments have synthesizer-style keys, and no more than 61 of them at that. Weighted actions such as those on digital pianos tend to be, well, weighty, so you won't find them on portables. Some starter keyboards have mid-size or miniature keys, for smaller fingers, naturally. And if your fingers are already spoken for, there are two Roland instruments included here that will add auto-accompaniment to your MIDI keyboard, the RA-30 and RA-95.

For an explanation of the categories used in the following chart, please refer to page 69.

Portable Keyboards

	Casio CTK-150, CTK-100, CTK-50	Casio CTK-510, CTK-500	Casio CTK-530	Casio CTK-630, CTK-550
Suggested Retail Price	CTK-150: $149; CTK-100: $149; CTK-50: $129	$299.99	$299	CTK-630: $449; CTK-550: $449
Number of Keys	49	61	61	61
Left-hand Controllers	—	—	—	—
Polyphony/Multitimbral parts	CTK-150: 16/—; CTK-100, CTK-50: 8/—	16/—	24/8	16/16
# of Sounds/General MIDI	100	120	64	100
Effects	—	—	—	CTK-630: 3
Auto-accompaniment Styles	100	40	64	100
Patterns per Style/ Instrumental Parts per Style (Max)	1/3; 1-finger	3/3; 1-finger	2/4; 1-finger	2/3; 1-finger
Disk Drive Reads/Writes	none	none	none	none
External Memory	—	—	—	—
Sequencer	—	—	—	CTK-630: 1/1,300/96 ppq/1
Display	—	—	LED 3 ch	LED 3 ch
Pedals, Jacks	—	—	—	jack: sust
Amplifier and Speakers	1W, 1 x 4"	2 x 1W; 2 x 4-2/3"	2 x 2W; 2 x 4-2/3"	2 x 2W; 2 x 4-2/3"
Audio In/Out	Out: 1 x 1/4" hph	Out: 1 x 1/4" hph	Out: 1 x 1/4" hph	Out: 1 x 1/4" hph
Weight and Dimensions	7 lbs, 33-3/4" x 11-1/4" x 3-3/8"	9 lbs 14 oz, 36-15/16" x 13-1/4" x 4-3/10"	9 lbs, 12 oz, 36-2/3" x 12-3/4" x 3-7/10"	CTK-630: 11 lbs, 36-2/3" x 13-7/8" x 3-3/8"; CTK-550: 11 lbs, 9 oz, 36-3/4" x 14-1/2" x 5-1/4"
Other	CTK-150: 30 demo songs, minus-melody feature. Battery powered or use optional AD-5 adaptor, $25	"Ad-lib" feature silences notes outside of key. Battery powered or use optional AD-5 adaptor, $25. No MIDI	Tuning and transpose functions. Battery powered or use optional AD-5 adaptor, $25	CTK-630: Assignable pads. CTK-550: 40 demo songs, Part Off switch for single hand practice. No MIDI. Both: Tuning and transpose functions. Battery powered or use optional AD-5 adaptor, $25

Casio CTK-750, CTK-650	Casio KT-90G	Casio SA-38, SA-35, SA-5, SA-2	Farfisa F1, F5
CTK-750: $699; CTK-650: $599	$499	SA-38: $69.95; SA-35: $89.99; SA-5: $39.95; SA-2: $29.95	F1: $4,995; F5: $3,495
61	61	SA-38, SA-35: 32 mid-size; SA-5, SA-2: 32 mini	F1: 76; F5: 61
CTK-750 only: pb	—	—	—
32/16	16/16	SA-38, SA-35: 4/—; SA-5, SA-2: 2/—	34/16
128/GM	120, GM	SA-38, SA-35, SA-5: 100; SA-2: 15	122
CTK-750: 16; CTK-650: 2	1	—	8 sim, 42
128	40	SA-38: 32; SA-35: 24; SA-5: 24; SA-2: 8	5 each of: 8-beat, 16-beat, rock, dance, swing, America, trad 1, trad 2, trad 3, symphonic, Latin 1, Latin 2
6/5; 1-finger	2/3; 1-finger	1/3	7/10, 1-finger, user-rec, user-save, MIDI edit
none	none	none	SMF (Atari, DOS 720Kb, DOS 1.4M)/SMF
—	—	—	cartridge
CTK-750: 6/5,800/96 ppq/2; CTK-650: 1/1,300/96 ppq/1	—	—	16/70,000/768/???, quan, punch, save, metro
LED 3 ch	—	—	Backlit LCD, 240 x 64 pixel
jack: sust, strt/stp	—	—	jack: sust, patsw, strt/stp, vol, Leslie speed
CTK-750: 2 x 5W; 2 x 4-2/3"; CTK-650: 2 x 2W; 2 x 4-2/3"	2 x 1W; 2 x 5"	SA-38, SA-35: 2 x 1W; 2 x 3-1/8"; SA-5, SA-2: 1/2W, 1 x 2-1/2"	F1: 2 x 30W, 2 x 10", 2 x 8"; F5: 15 + 7 + 7W, 1 x 10", 2 x 8"
Out: 1 x 1/4" hph	In: 1 x 1/4" Out: 1 x 1/4"; 1 x RCA video	SA-38, SA-35, SA-5: Out: 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 2 x 1/4" hph
CTK-750: 15 lbs, 8 oz, 38" x 16-1/4" x 5-2/3"; CTK-650: 11 lbs, 10 oz, 36-3/4" x 14-1/2" x 5-1/4"	18 lbs; 38-1/2" x 16-1/5" x 5-1/2"	SA-38: 2 lbs, 24-1/8" x 6-15/16" x 2-3/8"; SA-35: 2 lbs, 24-3/8" x 7" x 2-1/4"; SA-5: 1 lb, 8 oz, 15" x 4-15/16" x 1-6/10"; SA-2: 1 lb, 8 oz, 15" x 4" x 1-7/16"	F1: 50 lbs, 47-3/4" x 17" x 6"; F5: 30 lbs, 42" x 16-1/2" x 5"
4 keyboard velocity settings. Assignable pads. Tuning and transpose functions. Battery powered or use optional AD-5 adaptor, $25	Audio CD and CD plus graphics player built-in. Video out for lyrics	No MIDI. SA-38: 5 percussion pads; All: Battery powered or use optional AD-5 adaptor, $25	PS 262 multi pedal, $115; MH 230 mic stand, $90; EP 265 volume pedal, $40; PB 290 pedalboard, $300; MEC-2 sample card, $325

Manufacturer contact list on page 162

Portable Keyboards

	Generalmusic CD30, CD20, CD10	Roland E-36, E-16	Roland E-66	Roland G-800
Suggested Retail Price	CD30: $995; CD20: $795; CD10: $495	E-36: $1,195; E-16: $795	$1,695	$2,995
Number of Keys	61	61	61	76
Left-hand Controllers	CD30, CD20: pb & mod on trackball	pb & mod buttons	pb & mod buttons	pb & mod on joystick
Polyphony/ Multitimbral parts	32/16	E-36: 28/16, E-16: 24/6	28/16	64/32
# of Sounds/General MIDI	256/GM	223; E-36: programmable/GM	241 programmable/GM	689 programmable/GM
Effects	2 sim, 32	E-36: 2 sim, 16; E-16: 2 sim, 2	2 sim, 16	4 sim, 4
Auto-accompaniment Styles	8 dance, 8 Latin, 16 pop, 8 rock, 8 folk, 32 r&b, 8 jazz, 8 ethnic	4 rock, 2 rap, 2 shake, 2 dance, 2 funk, 4 8-beat, 4 16-beat, 4 rock, 4 slow rock, 4 rock n roll, 8 jazz, 14 Latin, calypso, 2 reggae, 4 waltz, 2 march, fox trot, polka, baroque, 2 country	2 rock, rap, house, techno, dance, 2 funk, 4 8-beat, 4 16-beat, 4 rock, 4 slow rock, 8 jazz, 13 Latin, calypso, reggae, fusion, 3 waltz, march, fox trot, polka, baroque, country	8 rock, 2 rap, 2 house, 2 techno, 2 dance, 2 funk, 2 fusion, 4 jazz, 8 8-beat, 8 16-beat, 4 rock, 8 slow rock, 2 blues, 6 swing, 6 waltz, 2 reggae, 16 Latin, cool jazz, swing combo, r&b, big band, shuffle, pop rock, rhumba, beguine, Dixie, Charleston, mazurka, baroque, 2 tango, polka, quadrangle, tarantella, 2 fox-trot, march, disco, 3 schlager, 4 German, Sevilla, 11 country, paso doble, gospel
Patterns per Style/ Instrumental Parts per Style (Max)	10/4; 1-finger, user-rec, user-save, MIDI edit	36/4; 1-finger; E-36 add: MIDI edit	36/5; 1-finger, MIDI edit	8 (=4 drum var)/16; 1-finger, user-rec, user-save, MIDI edit
Disk Drive Reads/Writes	CD30 only: SMF, CD, WS/CD	none	SMF, ism/SMF	SMF, ism/SMF
External Memory	—	E-36 only: PCM card	—	—
Sequencer	CD30, CD20: 7/10,000/96 ppq/4; quan, save, metro; CD10: 3/10,000/96 ppq/1; quan, save, metro	1/2,500/96 ppq/1	1/180,000/120 ppq/0; save	8/180,000/120 ppq/0; save, metro
Display	backlit LCD: CD30, CD20: 16 ch x 2 line; CD10: 16 ch x 1 line	3 ch LED	3 ch LED	backlit LCD, 240 x 64 pixel
Pedals, Jacks	jacks: sust, vol	jacks: sust	jacks: sust	jacks: sust, patsw, strt/stp, vol
Amplifier and Speakers	2 x 5W; 2 x 5 "	2 x 3W; 2 x 5"	2 x 5W; 2 x 5"	—
Audio In/Out	CD30, CD20 only: In: 2 x 1/4" all: Out: 2 x 1/4"; 1 x 1/4" hph	Out: 2 x 1/4"; 1 x 1/4" hph	Out: 2 x 1/4"; 1 x 1/4" hph	Out: 2 x 1/4"; 1 x 1/4" hph
Weight and Dimensions	13 lbs; 38" x 12-2/3" x 4-1/4"	E-36: 4 lbs, 5 oz; 41-15/16" x 13-11/16" x 4-9/16"; E-16: 11 lbs, 7 oz; 37-5/8" x 13-3/8" x 4-9/16"	14 lbs, 5 oz; 41-15/16" x 13-11/16" x 4-9/16"	39 lbs; 12 oz.; 49-15/16" x 16-1/6" x 5-15/16"
Other	13 touch pads. AC adaptor $25. Footswitch $17	E-36: GS compatible. Optional FC-7 foot controller, $195. Music style disks, $19.95. Both: Optional PK-5 MIDI pedals, $795	GS compatible. Optional FC-7 foot controller, $195. Optional PK-5 MIDI pedals, $795. Music style disks, $19.95	GS compatible. Optional FC-7 foot controller, $195. Optional PK-5 MIDI pedals, $795. Music style disks, $19.95

Roland RA-30	Roland RA-95	Suzuki SP-10, SP-9, SP-8	Technics SX-KN3000
$1,295	$1,295	???	$4,995.95
—	—	61	61
—	—	pb, mod	pb, mod; assign
24/16	28/16	SP-10: 28/16, SP-9, SP-8: 32/16	64/16
282, 8 drum kits, programmable/GM	241 programmable/GM	256, programmable/GM	260 programmable/GM
2 sim, 16	2 sim, 16	SP-10: 21, vocoder; SP-9: 11; SP-8: 20	4 sim, 55
2 rock, rap, house, techno, dance, 2 funk, 4 8-beat, 4 16-beat, 4 rock, 4 slow rock, 8 jazz, 13 Latin, calypso, reggae, fusion, 3 waltz, march, fox trot, polka, baroque, country	2 rock, rap, house, techno, dance, 2 funk, 4 8-beat, 4 16-beat, 4 rock, 4 slow rock, 8 jazz, 13 Latin, calypso, reggae, fusion, 3 waltz, march, fox trot, polka, baroque, country	SP-10: 64; SP-9: 98; SP-8: 100	15 8-beat, 7 16-beat, 6 jazz-rock-soul, 6 funk-Latin, 7 dance-pop, 6 swing, 8 rock, 7 jazz combo, 7 U.S. trad, 10 march-waltz, 9 trad-showtime, 12 Latin
2/5; 1-finger	36/5; 1-finger, MIDI edit	SP-10: 8/8, 1-finger, user-rec, user-save; SP-9: 1/7, 1-finger, user-rec, user-save; SP-8: 5/7; 1-finger	8/5; 1-finger, user-rec, user-save, MIDI edit
—	SMF, ism/SMF	SMF/proprietary	SMF, Tech-note/SMF
—	—	—	—
1/3,500/—/1; metro	1/180,000/120 ppq/0; save	SP-10: 16/90,000, 96 ppq/5; SP-9: 16/60,000/96 ppq/5; SP-8: 16/30,000/96 ppq/5; all: quan, save	16/40,000/96 ppq/1; quan, punch, save, metro
3 ch x 1 line LED	3 ch x 1 line LED	SP-10: 240 x 320 pixel backlit graphic touch-screen LCD, lyr; SP-9: 240 x 64 pixel backlit graphic LCD; SP-8: 40 ch x 2 line backlit LCD	16 ch x 2 line LCD
jacks: patsw, strt/stp, vol	jacks: sust, patsw, strt/stp	jacks: sust, vol, assign	jacks: sust, patsw, strt/stp, vol
—	—	SP-10: 2 x 20W, 2 x ???"; SP-9: 2 x 15W, 2 x ???"; SP-8: 2 x 10W, 2 x ???"	2 x 18W; 2 x 5-1/2", 2 x 2-1/2"
Out: 2 x 1/4"; 1 x 1/4" hph	Out: 2 x 1/4"; 1 x 1/4" hph	In: 1 x 1/4" mic, 2 x 1/4" Out: 2 x 1/4"; 2 x 1/4" hph	In: 2 x 1/4" Out: 4 x 1/4"; 1 x 1/4" hph
3 lbs, 5 oz; 12-1/16" x 9-11/16" x 2-9/16"	6 lbs, 10 oz; 15-3/4" x 8-11/16" x 2-15/16"	SP-10: 43 lbs; 44-1/2" x 17" x 7"; SP-9: 33 lbs; 44" x 17" x 5"; SP-8: 28 lbs; 44" x 14-1/2" x 5-1/2"	29 lbs, 13 oz; 41-11/32" x 14-7/8" x 6-15/16"
Optional KP-24 acoustic keyboard pickup, $300	GS compatible	GS compatible. SP-10, SP-9: built-in music education software	Optional S2-P1 Footswitch

Manufacturer contact list on page 162

Portable Keyboards

	Technics SX-KN701, SX-KN501	Technics SX-KN901	Wersi P1000	Wurlitzer WX-2
Suggested Retail Price	SX-KN701: $1,695.95; SX-KN501: $1,195.95	$2,495.95	$5,490	$3,895 (w/o external video, $3,319)
Number of Keys	61	61	61	61
Left-hand Controllers	pb	pb	pb, mod	pb, mod on trackball
Polyphony/Multitimbral parts	32/16	32/16	54/10	32/16
# of Sounds/General MIDI	SX-KN701: 136; SX-KN501: 129/GM	200 programmable/GM	256 programmable/GM (512 HD version)	472/GM
Effects	SX-KN701: 4 sim, 12; SX-KN501: 2 sim, 12	4 sim, 17	—	2 sim, 48
Auto-accompaniment Styles	14 8-beat, 8 16-beat, 10 modern rock, 7 rock, 8 funk-dance, 15 Latin, 5 swing, 8 jazz, 4 waltz, 4 march, 9 trad, 7 US traditional	14 8-beat, 8 16-beat, 10 modern rock, 7 rock, 9 funk-dance, 15 Latin, 5 swing, 8 jazz, 4 waltz, 4 march, 9 trad, 7 US traditional	16 rock, 7 Latin, 10 swing, 5 country, 4 waltz, 6 ethnic	8 each of: pop, 8-beat, rock, dance, jazz, Latin, folk, ethnic
Patterns per Style/ Instrumental Parts per Style (Max)	4/5; 1-finger; 701 add: user-rec, user-save	6/5; 1-finger, user-rec, user-save, MIDI edit	6/7; 1-finger, user-rec, user-save, MIDI edit	5/6, 1-finger, user-rec, user-save, MIDI edit
Disk Drive Reads/Writes	—	SMF, DOC/SMF	SMF/SMF	SMF, WX, WS/SMF, WX
External Memory	—	—	—	—
Sequencer	2/2,800/96 ppq/0; 701 add: 3 songs in memory, quan, metro	16/19,000/96 ppq/1; quan, save, metro	16/???/768 ppq/15 quan, punch, save, metro	16/250,000/192/8, quan, punch, save, metro
Display	LED	16 ch x 2 line LCD	Touch screen backlit LCD, 38 ch x 12 lines	Backlit LCD, 240 x 64 pixel
Pedals, Jacks	jacks: sust, patsw, strt/stp	jacks: sust, patsw, strt/stp, vol; assignable	sost, patsw, strt/stp; jacks: sust, vol. assignable.	jacks: sust, sost, patsw, strt/stp, vol, Leslie speed
Amplifier and Speakers	2 x 5W; 2 x 4-3/4"	2 x 8W; 2 x 4-3/4"	70W; 2 x 8", 2 x 4"	2 x 20W, 2 x 6"
Audio In/Out	1 x 1/4" hph	In: 4 x 1/4" Out: 4 x 1/4"; 1 x 1/4" hph	In: 2 x 1/4" Out: 2 line, 2 audio;1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph
Weight and Dimensions	12 lbs, 14 oz; 39-9/32" x 13-5/8" x 4-5/8"	17 lbs, 10 oz; 39-9/32" x 13-5/8" x 4-5/8"	48 lbs; 43-1/2" x 17" x 5-1/2"	28 lbs, 43" x 15" x 4"
Other	701 only: recordable manual sequencer pads. Optional S2-P1 Footswitch	Step and real-time record. Optional S2-P1 Footswitch		Displays melody, lyrics, chords on LCD and via video out. Sample RAM expansion option

Yamaha PSR 185, PSR 77	Yamaha PSR 420, PSR 320	Yamaha PSR 620, PSR 520	Yamaha PSR 7000, PSR 4000
PSR 185: $599.95; PSR 77: $499.95	PSR 420: $599.95; PSR 320: $499.95	PSR 620: $995.95; PSR 520: $699.95	???
PSR 185: 61; PSR 77: 49	61	61	61
—	—	pb	pb, mod, assign
12/—	28/16	32/16	7000: 64/32; 4000: 32/16
100	128, 8 drum kits/GM	141/GM	7000: 473, prog; 4000: 235, prog/GM
—	1 sim, 4	3 sim, 68	7000: 4 sim, 100; 4000: 3 sim, 66
14 rock, 10 pop, 8 r&b, 13 dance, 16 jazz, 13 Latin, 4 Caribbean, 5 ballroom, 10 other	8 rock, 9 pop, 9 pop ballad, 4 rock & roll, 8 r&b, 6 dance, 7 disco, 4 trad jazz, 6 contempo jazz, 9 Latin, 3 Caribbean, 8 c&w, 9 world, 7 ballroom standard, 9 ballroom latin	7 rock, 11 pop, 8 pop ballad, 4 rock & roll, 6 r&b, 5 dance, 6 disco, 5 trad jazz, 4 contempo jazz, 9 Latin, 3 Caribbean, 9 c&w, 7 world, 7 ballroom standard, 5 ballroom Latin	120
1/—, 1-finger	4/5, 1-finger, user-rec, user-save	4/5, 1-finger, user-rec, user-save, MIDI edit	5/8, 1-finger, user-rec, user-save, MIDI edit
none	none	PSR 620 only: SMF, Dsklv, Pianosoft/SMF, Dsklv, Pianosoft	SMF, Dsklv, Pianosoft/SMF, Dsklv, Pianosoft
—	Yamaha music cartridge	Yamaha music cartridge	—
—	3/1300/???/3, metro	3/4200/???/8, punch, metro; PSR 620 add: save	16/???/???/—, punch, metro; PSR 620 add: save
—	LCD	backlit LCD	backlit LCD, 240 x 320 pixel
—	jack: sust	jack: sust	jack: sust, vol
PSR-185: 2 x 3.8W, 2 x 4"; PSR-77: 2 x 1W, 2 x 4"	2 x 6W, 2 x 4-3/4"	2 x 6W, 2 x 4-3/8"	2 x 20W, 2 x 6-1/4", 2 x 2"
Out: 1 x 1/4" hph	Out: 1 x 1/4" hph	Out: 2 x 1/4", 1 x 1/4" hph	In: 2 x 1/4" Out: 2 x 1/4", 1 x 1/4" hph
PSR-185: 7 lbs, 15 oz, 38" x 11-1/4" x 4-1/2"; PSR-77: 9 pbs, 8 oz, 36-5/8" x 13-5/8" x 5-3/8"	13 lbs, 3 oz, 36-3/4" x 14-5/8" x 5"	PSR 620: 17 lbs; PSR 520: 16 lbs, 3 oz, 36-3/4" x 14-5/8" x 5"	PSR 7000: 31 lbs, 15 oz, 41-2/3" x 17-1/2" x 7"; PSR 4000: 35 lbs, 3 oz, 42-3/10" x 18-1/10" x 7"
PSR-185: Minus-one function	PSR-420: LEDs above each key indi- cate what note to play in sequenced melody. Both: Minus-one function. Drum pads. Pianosoft and Disklavier compatible	Registration memory. Minus-one function	Mic input mixed digitally & processed with effects

Manufacturer contact list on page 162

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QS6

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How much is your creativity worth? You really can't put a price on something so valuable. The powerful new **QS6™ 64 Voice Expandable Synthesizer** gives you everything you need to push your creativity to new levels. It's the affordable solution for musical inspiration.

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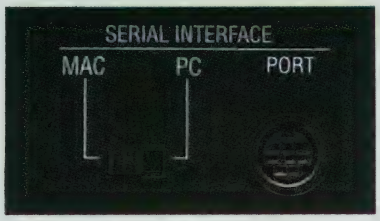
The QS6 has all the great sounds that inspire you to do your best work. You'll find everything from realistic acoustic instruments to cutting-edge and vintage synth sounds, all accessible at the touch of a button. Its digital 16-bit linear non-compressed samples provide warm, clean, and incredibly accurate voicing for every performance. The onboard multieffects use the same advanced processor as our Q2™ Master Effects, and include reverb, chorus, flange, delay, rotating speaker effects and more. Combine these effects with the QS6's massive sound library, and you'll create CD-quality mixes right from your synth. The rhythmic/sonic loops let your creativity groove just by holding down a single key. QS6's great feeling, semi-weighted keyboard offers velocity, release velocity and aftertouch for expressive playability. Furthermore, all of this power is packed into a tough all-metal chassis that will take the punishment when you take your show on the road.

Choice, Variety and Expandability

The QS6 offers a huge palette of internal sounds - 8 megabytes of sample waveforms, 640 Programs, and 500 Mixes - giving you thousands of timbral options to choose from. This sonic library can be expanded instantly by simply plugging in a 4MB or 8MB Alesis QuadraCard™, like our acclaimed Stereo Grand Piano card. Also, the QS6 includes Alesis' exclusive Sound Bridge™ software (for Mac and PC) which allows you create custom cards with your own sound files from your computer. This innovative technology guarantees that you'll always have access to new sounds.



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The QS6 uses the same advanced synthesis architecture as its big brother, the QuadraSynth Plus™. True 64-voice polyphony lets you assemble complex sequences and rich, stacked chords. Its 16 channel multitimbral Mixes and a built-in computer interface (also for both Mac and PC) give you easy access to the world of MIDI sequencing, software and composition. In fact, we've included a free CD-ROM with the QS6 that's packed with extra sounds, killer sequences, and Steinberg's Cubase Lite™ sequencing software to help get your creative juices flowing.

The QS6 is an instrument that was crafted to help you unlock your creative talents. Stop by an Alesis Dealer and start creating new music with the newest keyboard from Alesis.

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POWER AMP - Most powered mixers in this range have earned a reputation of underpowered performance especially with the many power hungry professional speakers available today. But the Powerstation delivers 300 watts (into 4 ohms) per side which drive even a power hungry system to very LOUD levels. And we do it with the lowest distortion figures in the industry (THD = 0.025% @ 4 ohms/both channels.)

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One of the most amazing things about the Powerstation is that we've managed to package all of this performance for less than $1600. See your nearest Spirit dealer today for a demo and you'll understand why British Sound is *back in the U.S. . . . back in the U.S. . . .*

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BUYER'S GUIDE

Plug-In PERCUSSION

KITS, CONTROLLERS, MODULES, & MACHINES

BY **GREG RULE**

Songs with weak drum tracks are like houses built on sand. If your foundations aren't solid, everything you stack on top is in serious danger of collapse. Don't take your drum and percussion sequences lightly, campers. There are plenty of quality products on the market to help you lay down great-sounding, stone-solid beats — be it with sticks on pads or fingers on buttons.

With that in mind, we've compiled a representative (though not all-encompassing) list of the current "plugged" percussion crop, all of which were in production at the time of this writing. Items such as rhythm-type computer software, individual drum pads, triggers, and their associated hardware weren't included; we chose to limit this group to self-contained systems and major electronic percussion components along the lines of drum machines and modules. As always, we encourage you to visit a local retailer or contact the various manufacturers for a more detailed look at their available instruments and accessories. The addresses and phone numbers can be found beginning on page 162. One final note: A few items in the list, such as the Akai MPC3000 and ddrum3, appear in other sections of this magazine (the sampler chart, for example), so if you lust for more info on a particular hybrid-type product, you might look for it elsewhere in this issue. Happy hammering!

PERCUSSION CONTROLLERS/KITS

ddrum3. Electronic drum system with pads and sampling module. 16-bit/44.1kHz sampling, ten trigger inputs, 2ms trigger response time, SCSI option, two PCMCIA card slots as well as internal memory expansion board, drum pads with rims and tunable heads. $3,650 for module, $1,695 for five-piece Precision Pad Set, $445 for acoustic drum triggering system.

Kat drumKat. Self-contained MIDI percussion controller. Ten FSR gum rubber pads, 30 user kits, four factory kits, motif generator, up to eight notes per pad, nine trigger inputs, breath controller input. Reviewed June '87. $1,149.

Kat drumKat EZ. Self-contained MIDI percussion controller. Ten FSR gum rubber pads, 24 user kits, three notes per pad, motif generator,

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Electronic Percussion

six trigger inputs. $849.

Kat dK10. Self-contained MIDI percussion controller. A scaled-down version of the drumKat with ten FSR pads, one trigger input, four user kits, six factory kits, pad response training mode. $499.

Kat malletKat Pro. Self-contained marimba-style MIDI percussion controller. Modular design allows extra octaves to be added, 127 user setups. $1,999.

Kat malletKat Pro WS (with sounds). Same features as malletKat Pro but with 300 internal sounds by Kurzweil. $2,899.

Kat trapKat. Self-contained MIDI percussion controller. 24 gum rubber pad surfaces (both raised and flat surfaces), 24 programmable kits, 24 factory kits, 34 GM-mapped sequences, four footswitch inputs, two external pad inputs, breath control input. Reviewed June '95. $1,199.

Korg Wavedrum. Self-contained electronic drum with DSP synth engine. Playable by sticks or hands, 62 algorithms, 100 programmable patches, optional RE1 remote programmer, sys-ex storage, uses a tunable 10" drumhead, tripod stand included. Reviewed March '95. $2,500.

Roland SPD-11 Total Percussion Pad. MIDI percussion controller with sounds. Eight velocity-sensitive pads, 255 16-bit PCM sampled sounds, 64 patches, four patch chains, built-in digital effects processor (reverb, delay, chorus, and flange), four dual trigger inputs. $895.

Roland TD-5K Compact Drum System. Electronic drum kit. Includes TD-5 drum module (see below), five PD-5 pads, FD-7 hi-hat controller, KD-5 kick trigger (reverse beater included), MDS-7 Total Drum System Stand (includes all mounting hardware and cables). $1,795.

Roland TDE-5K Compact Drum System: Expanded Kit. Electronic drum kit. Includes TD-7 drum module (see below), seven PD-5 pads, FD-7 hi-hat controller, KD-5 kick trigger (reverse beater included), MDS-7 Total Drum System Stand (includes all mounting hardware and cables). $2,045.

Roland TDB-7K Total Drum System: Basic. Electronic drum kit. Includes TD-7 drum module (see below), four PD-5 pads, FD-7 hi-hat controller, KD-5 kick trigger (reverse beater included), MDS-7 Total Drum System Stand (includes all mounting hardware and cables). $2,050.

Roland TDE-7K Compact Drum System: Expanded. Electronic drum kit. Includes TD-7 drum module (see below), eight PD-5 pads, FD-7 hi-hat controller, KD-5 kick trigger (reverse beater included), MDS-7 Total Drum System Stand (includes all mounting hardware and cables). Reviewed Oct. '94. $3,145.

Simmons Turtletrap. Self-contained MIDI percussion controller. Ten soft rubber pads, eight trigger inputs, 30 programmable kits. $799.

Walkabout Percussion Controller. Strap-on pad set/retrofit for Roland SPD-11. $1,595 and up.

Yamaha TMS4. Electronic drum kit. Includes TMX drum module (see below), four EP75 dual zone pads, KP75 kick pad, two WS840 double pad stands. $1,580.

Yamaha TMS5. Electronic drum kit. Includes TMX drum module (see below), five EP75 dual zone pads, KP75 kick pad, FC5X footswitch, three WS840 double pad stands. $1,875.

Yamaha TMS8. Electronic drum kit. Includes TMX drum module (see below), eight EP75 dual zone pads, KP75 kick pad, FC5X footswitch, four WS840 double pad stands. $2,460.

Zendrum. MIDI strap-on percussion controller. 24 touch-sensitive finger triggers, 127 programmable kits, four-way velocity cross-fades, sys-ex storage, two footswitch ins. Reviewed Nov. '95. $1,350 and up.

PERCUSSION SOUND MODULES

Alesis D4. Single-space rack module with 500 samples, 3Mb waveform ROM, front-panel trigger button, 16-voice polyphony, 12 trigger inputs with adjustable gain. Reviewed Feb. '92. $399.

Alesis DM5. Single-space rack module with 500 samples (including the "best of" from Alesis HR-series machines), 18-bit DACs, 12 trigger inputs, sample randomization utility, MIDI overflow. $449.

E-mu Procussion. 16-bit sounds (4Mb sample ROM) configurable into 1,000-plus locations, 128 kits (64 preset, 64 user), 32-voice polyphony, extensive stacking and editing, cross-switching and -fading, six audio outputs, two effects sends/returns. Reviewed June '91. $995.

Roland TD-5. 210 drum and percussion samples, 32 kits, built-in digital effects processor with reverb and chorus, 14-voice polyphony, metronome feature, eight dual trigger inputs. $595.

Roland TD-7. 512 sounds made up of 256 16-bit waveforms, 32 kits, 14-voice polyphony, velocity cross-switching and -fading, layering, built-in effects, sequencer (96 ppq, 24 preset patterns, 24 user patterns), metronome, and nine dual trigger inputs. Reviewed Oct. '94. $795.

Yamaha TMX. 245 drum and percussion samples, AWM2 sample playback tone generator, 32 programmable kits, 12 trigger inputs, four audio outputs, single-space rack module with headphone output and accompanying volume control. $495.

DRUM MACHINES

Akai MPC3000. 16-bit sampler/MIDI sequencer/drum machine, up to 16Mb RAM, 32-voice polyphony, 16 velocity-sensitive buttons, 99-track sequencer, 96 ppq, SMPTE read/write, four MIDI outputs, ten audio outputs. $3,699.

Alesis SR16. 233 16-bit sounds, 1Mb waveform ROM, 96 ppq, 100 songs, 100 user patterns, 100 preset patterns, 100 user fills, 100 preset fills, 50 user kits, 50 preset kits, four audio outputs. Reviewed May '91. $349.

Boss DR-5 Dr. Rhythm Section. 256 16-bit sampled sounds, 48 ppq, 64 kits (48 preset, 16 user), 400 patterns, 20 songs, 4-track sequencing, guitar input with built-in tuner, amp simulator, external pitch function for triggering sounds from a guitar. $595.

Boss DR-550mkII Dr. Rhythm. 91 16-bit sampled sounds, 16 ppq, 12-voice polyphony, 64 user patterns, 64 preset patterns, eight songs, battery or AC powered. Original DR-550 reviewed July '90. $350.

Boss DR-660 Dr. Rhythm. 255 16-bit editable sounds, 96 ppq, built-in digital effects processor (reverb, delay, chorus, and flange), 39 drum kits, 250 patterns, 100 songs, stereo outputs plus two individual outs. $595.

Oberheim Drummer. Interactive drum pattern sequencer. Analyzes and alters incoming MIDI data *en route* to a drum machine or drum module. Reviewed July '91. $249.

Roland R-70 Human Rhythm Composer. 16-bit sounds, 96 ppq, 16 velocity- and aftertouch-sensitive pads, positional pad for realtime nuance control, 210 preset instruments plus 32 "copy" instruments, 100 patterns, 20 songs, built-in effects processor (reverb, delay, chorus, and flange), stereo outputs plus two individual outs. Reviewed July '92. $950.

Roland R-8mkII Human Rhythm Composer. 16-bit sounds, 96 ppq, 200 internal instruments, 26 additional instruments on SN-R8 sound cards, velocity- and aftertouch-sensitive pads, 32 preset patterns, 200 programmable patterns, up to ten songs, nuance control provides timbral variations of sounds, eight individual outputs plus two stereo outs. Original R-8 reviewed April '89. $1,245.

Yamaha RY8. 256 AWM sampled sounds, 24 ppq, 28-note polyphony, 200 preset patterns, 50 user patterns, 200 backing patterns, assignable chord track, AC or battery powered. $299.95.

Yamaha RY20. 300 AWM2 sampled sounds, 96 ppq, 50 songs, 20 preset kits, 20 user kits, DSP with six reverbs and four delays with tempo sync, 12 velocity-sensitive pads with four curves, groove quantize, track-based patterns. $499.95.

Hands Job.

Got a bunch of restless hands? Who doesn't? But we put ours to good use and created the e-64 — a stunning 64-voice digital sampling system. Sporting enough polyphony to keep 13 of your favorite hands working up a sweat. That's right, 64 fingers worth of massaging the ivories!

But the e-64 is not just another digital sampler. Once you've gotten over the hard fact that E-mu has *done it again* with the industry's only 13-hand sampler, catch your breath and check out its features. Like up to 64 MB of sample memory, 64 6-pole digital resonant filters and compatibility with E-mu and Akai S1000/1100 16-bit sound libraries. Then get a grip on a few more — including an enormous new icon-based user interface, on-board graphic waveform editing, resampling and load while you play, virtually distortionless pitch transposition over 10 octaves, and AES/EBU digital I/O.

The e-64 will really make you squirm when you groove on its righteous audio resolution. That's what it's all about anyway, right? Right. The e-64 features the same pristine audio quality that you expect from the company that pioneered sampling technology in the first place. (Duh... we're talkin' Emulator here, guys.)

The bottom line? If you're shopping for a sampler, there's no comparison to E-mu's rock hard e-64. If you're not looking for a sampler, you should be. The e-64 has turned the page on what a sampler can do for your creativity and your music. Serious self stimulation.

But don't break this rhythm. The e-64 is exploding at your favorite E-mu dealer right now. So get your hands out of your pockets and do the right thing... Check it out for yourself. It's a real handful.

E-MU Systems

To find your local E-mu dealer, contact: PO Box 660015, Scotts Valley, CA 95067-0015 • 408.438.1921
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I M A

Sounds: 6 MB ROM, 376 ROM Sounds (General MIDI) - Over 1,000 User RAM Sounds, Optional 2 MB RAM to load new PCM samples

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Arranger: Key-Start, One-Finger/Fingered/ Free (Pianist) Chord-Modes, Bass-Follow, Memory, Harmony, Auto Backing

Polyphony 32 notes

Disk Drive: 3.5" 2DD/2HD, Load, Save, Erase, Format, Directory, Load while Play– Compatible with Standard MIDI Files

Sound Source: PCM, Wavetables, Multiloop, Crossfade Multiwave, Subtractive Synthesis

Imagine... a keyboard so seemingly intuitive, it will take your initial song ideas and help finish your musical composition quickly and easily. ***Imagine...*** having a keyboard that turns your usual club dates into the "party" that everyone hears about the next day. ***Imagine...*** teaching composition and melodic structure to children with a user-friendly interactive multimedia keyboard. ***Imagine...*** getting your church congregation's heads out of the hymnals and singing praises while watching the song lyrics and music on a large screen television. ***Imagine no more,...*** reality is the **SX2** & **SX3** Multimedia Keyboard Workstations from Generalmusic.

The **SX** is a full-blown music workstation style keyboard, using the same "engine" as the award-winning S Series Turbo MusicProcessor, with all the things the MusicProcessor is famous for: hundreds of huge, fat sounds with 32-voice polyphony, a powerful 250,000 event 16-track sequencer (no that is not a typo, 250,000 events), dual digital effects processors, and a 3.5" disk drive. But that is only the beginning.

Although the **SX** has much in common with other workstations, it is capable of producing musical ideas of its own – riffs and patterns called *Styles* that can be edited, looped and combined to create and inspire your songs within minutes. The **SX** even has 64 programmable *Styles* for you to create your own patterns.

G I N E

Generalmusic's New SX Multimedia Workstation

Basically, this whole ad is trying to tell you that Generalmusic's **SX** keyboard is much better than the Korg i3. In case you still don't get it, here are the precise reasons why.

	Generalmusic SX2	Korg i3
Sounds	376 ROM+1672 RAM	256
Sequencer	250,000	40,000
Sequencer Resolution	192 ppq	96 ppq
Battery-backed Seq. RAM	Yes	No
Record Tempo Changes	Yes	No
Load while Playing	Yes	No
Styles	96	48
Store User Styles	32 + 32 Variations	4
User Prgmble Drumkits	Unlimited	2
Lyric / Score	Yes	No
Video Output	Yes (option)	No
Load New Samples	Yes (2MB option)	No
Price	Less	More

Sure, that would be enough - but wait, there's more! ***Imagine,*** without using any complicated computer software, pressing a single button and seeing any sequencer track instantly displayed as a musical score. Plus, the unique **SX** "preload" feature allows you to load new sounds and sequences while playing. The **SX** can be expanded with 2MB of optional sample RAM, which allows you to load in your favorite digital samples from choirs, to guitars, to applause. And, the optional video interface provides the connection to most televisions or computer monitors, which allows you to share your lyrics, music, or both with other people, turning your every performance into a multimedia event. For even more versatility the **SX** is available in two keyboard versions.

The **SX2** is 61-note keyboard, while the **SX3** has the expanded 76-note keyboard, both with lightly-weighted actions.

The new **SX** from Generalmusic is possibly more keyboard than you ever imagined. Way better, way cool, lots of fun, and for a lot less money than you might think. Visit your Generalmusic dealer today or contact Generalmusic Corporation for more information and the dealer closest to you.

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CIRCLE READER SERVICE # 140

BUYER'S GUIDE

Digital MULTITRACKS

STAND-ALONE DIGITAL TAPE & HARD DISK RECORDERS

BY **RANDY ALBERTS**

During the '80s, the concept of an affordable digital multitrack recorder — as in one that cost less than six figures — seemed farfetched. But you know how technology works. Earlier this decade, the ante was lowered to a few thousand dollars for a digital multitrack of either the tape or hard disk persuasion. We'll refer you elsewhere — the July '92 *Keyboard* cover story is the best reference we can think of — for a discussion on the merits of the two formats.

Consistent with the rest of this year's Buyer's Guide, we haven't included computer-dependent hard disk recording systems (see the December '94 *Keyboard* for a buyer's guide to those). All of the digital recorders in the following chart are stand-alone.

What about analog multitracks? Good question. For cassette multitracks, which qualify as absolute bargains compared to their digital counterparts, you only need last month's *Keyboard*, in which we printed a comprehensive chart and reviewed over a dozen models. Reel-to-reel is another story. As much as we'd love to track down and report on the current state of reel recorders, we simply didn't have the resources or space to do it. Besides, if it's 24 tracks you're craving, consider that the recorders in the following chart are modular; you can start with four or eight tracks and later add on more machines, all of them perfectly synced. (Note that one of the recorders listed here, the Otari RADAR, can be expanded up to 24 tracks all by itself.)

One caveat about upgrading to a digital recorder: You may need to replace other components in your studio to reap the sonic rewards a digital recorder offers. Specifically, your mixer's specs need to be optimal, as do any outboard processors that you route signals through. A digital recorder will only sound as good as the signal you pump into it. Remember: garbage in, garbage out.

The only chart item that requires clarification is the one labeled "EDL." It stands for Edit Decision List, a feature that requires a computer, so we'll say no more. —*Mark Vail*

Digital Multitracks

	Alesis ADAT-XT	Akai DR16	Akai DR8	Akai DR4d
retail price	$3,499	$4,995 (w/o hard drive)	$3,495 (w/o hard drive)	$1,795 (w/o hard drive)
recording medium	S-VHS tape	internal/external hard drive	internal/external hard drive	internal/external hard drive
# of tracks	8	16	8	4
# of inputs/bal, unbal	8/both	8 analog, 2 digital/balanced	8 analog, 2 digital/balanced	4 analog, 2 digital (4 digital w/ optional board)/balanced
# of outputs/bal, unbal	8/both	16 analog, 2 digital/balanced	8 analog, 2 digital/balanced	4 analog, 2 digital/balanced
operating levels	–10/+4	–10/+4	–10/+4	–10/+4
sync multiple units/ how many	yes/16 units	yes/7 units	yes/7 units	yes/4 units
# of simul record tracks	8 per unit	16 per unit	8 per unit	4 per unit
auto-punch in/out	yes	yes	yes	yes
rehearsal mode	yes	yes	yes	yes
programmable pre/post roll	yes	yes	yes	yes
built-in mixer	no	16 channels, gain control, pan, optional 3-band parametric EQ, automation	16 channels, gain control, pan, optional 3-band parametric EQ, automation	level adjust w/ track merge
type of display	vacuum fluorescent	7-segment custom fluorescent	7-segment custom fluorescent	7-segment LED
type of metering	variable peak hold	peak hold	peak hold	absolute
highest meter resolution	2-3dB per segment	1dB per segment	1dB per segment	2dB per segment
jog/shuttle control	no	varispeed wheel	varispeed wheel	varispeed wheel
levels of undo	—	6	6	1
transport controls	play, stop, record, rewind, FF (cue), tape engaged, tape disengaged	start, stop, record, rewind, FF, play, return to 0, play to, play over, play btwn in/out	start, stop, record, rewind, FF, play, return to 0, play to, play over, play btwn in/out	start, stop, record, rewind, FF, return to 0, play to stop, play btwn in/out
# of auto-locate points	10	100	100	99
auto-shuttle	yes	yes	yes	yes
export markers to EDL	—	no	no	no
synchronization	ADAT Sync Interface	SMPTE, MC/SPP, MTC, video word clock	SMPTE, MTC, video word clock	SMPTE, MTC
nominal sample rate	44.1/48kHz	32/44.1/48kHz	32/44.056/44.1/48kHz	44.1/48kHz
adjustable rate/ adjust range	yes/@48kHz +5.94% to –15.91%; @44.1kHz +12.2% to – 10.9%	yes/–41.3%/+58.3%	yes/–41.3%/+58.3%	???
digital I/O	ADAT Optical Digital Interface	AES/EBU, S/PDIF	AES/EBU, S/PDIF	AES/EBU, S/PDIF
backup options	—	DAT, SCSI, to ADAT w/804A card ($299)	DAT, SCSI, to ADAT w/804A card ($299)	DAT, SCSI
internal storage options	—	1Gb internal hard drive (DR-16HD) $???	1Gb internal hard drive (DR-8HD) $4,295.95	530Mb internal hard drive (DR4d530) $2,095
other options	BRC Remote and Synchronizer $1,499; AI-1 Digital Interface $899; AI-2 A/V Sync Interface $1,299	Interface cards: IB802T SMPTE$379; IB801S SCSI $299; IB803M MIDI $299; IB804A ADAT I/O $299; IB805R RS422 $299; IB806B Biphase $299; EQ8 $550; EQ16 $699	Interface cards: IB802T SMPTE$379; IB801S SCSI $299; IB803M MIDI $299; IB804A ADAT I/O $299; IB805R RS422 $299; IB806B Biphase $299; EQ8 $550; EQ16 $699	DL4d Remote $849 Interface cards: 302d digital I/O add-on $299; IB113M MIDI $209; IB112T SMPTE $249; IB1115 SCSI B $199

E-mu Darwin	Fostex DMT-8	Fostex RD-8	Otari RADAR	Roland DM-800
$3,195	$2,795	$4,395	$21,300	$6,295
internal hard drive	internal hard drive	S-VHS cassette	internal hard drive	internal hard drives
8	8	8	24	8
4/balanced (8 w/add on option)	8-22/unbalanced	8/balanced & unbal	24/both	4 analog, 4 digital/balanced
8/balanced	2-10/unbalanced	8/balanced & unbal	24/both	4 analog, 2 digital/balanced
–10/+4	–10	–10/+4	–10/+4	–10/+4 (w/ gain ctrl)
yes/???	no	yes/???	yes/8	yes/many
8 per unit	4	8	24 per unit	8 per unit
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
yes	yes	yes	yes	yes
8 x 2, pan, playlist-based editing, virtual slave reel	8 x 4 x 2, in-line monitoring, 22 inputs at mixdown, dual parametric EQ, aux sends	no	no	12 channels, EQ, snapshot & realtime
240 x 64 pixel LCD	front lit	7-seg LED & LCD	32-character LCD	LCD, RGB/S-video
LED peak hold, clip	peak hold	peak	peak hold	peak hold
10 segment/???	???	???	2dB per segment	2dB per segment
Wheel w/outer ring	wheel	no	rotary scrub/ shuttle (w/ RE-8 remote)	rotary rewind/FF
16	1	none	1	none
play (1x, 20x, 100x), stop, rec, rewind (5x), FF (3x)	start, stop, record, rewind, FF, play	play, stop, FF, rewind, record	play, stop, rewind, FF, record, return to 0	Start, stop, rewind, FF, record, return to 0
40 per playlist	6, nameable	no	99, nameable	40
no	yes	no	yes	yes
no	yes	no	yes	no
MTC, ADAT, 9-pin	MMC, MTC, bar/beat	SMPTE/ TC, RS-422	SMPTE, MTC	SMPTE, MTC, MMC, MIDI beat clock
44.1/48kHz	44.1kHz	44.1/48kHz	44.1kHz	32/44.1/48kHz
w/ optional PLL synth card: ±10% of nominal sample rate	no	±6%	yes/32-48kHz (+11.9% to –45% @ 44.1kHz)	no
S/PDIF, ADAT	S/PDIF	ADAT	AES/EBU, S/PDIF, ADAT link	S/PDIF, RMDB; ADAT & DA-88 w/ DIF-800 interface
SCSI DAT drives, QIC 1/4", audio backup to ADAT	DAT	—	Exabyte 8505 ($3,500)	SCSI DAT drives & removables
4001 w/1Gb: $3,795; 4002 w/1Gb: $3,995 (removable); $100 per additional media	540Mb internal incl	—	2Gb or greater	500Mb HDx2
ADAT I/O card $149; 4 input add-on $199; (JL Cooper Cue Point works as full-function remote control)	8051 remote foot control $???	8312 remote control, RMC-8 remote control, 8051 remote footswitch	8-track option: $10,164; 16-track option: $15,725; RE-8 remote: $1,100; free software for audio meter, timecode, etc. (requires SVGA & video card); EDB-3 external drive bay: $4,230	DIF-800 card $1,095; case: $100; roll stand $120; wrist rest $25

Manufacturer contact list on page 162

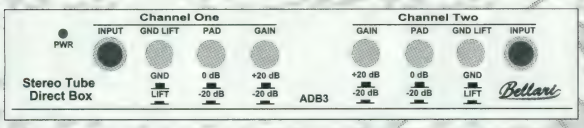
Digital Multitracks

	Roland DM-80	Sony PCM-800	Tascam DA-88	Vestax HDR-6
retail price	$8,995	$5,995	$4,799	$1,995
recording medium	internal hard drive	Hi-8mm tape	Hi-8mm tape	internal hard drive
# of tracks	8 (expandable to 32)	8	8	6
# of inputs/bal, unbal	8/balanced TRS	8/balanced XLR	8/both	16/both
# of outputs/bal, unbal	10/balanced TRS	8/balanced XLR	8/both	10/unbalanced
operating levels:	–10/+4	+4	–10/+4	–10/+4 (simultaneous)
sync multiple units/ how many	yes/many	yes/???	yes/16	yes/many
# of simul record tracks	8-32 per unit	8 per unit	8 per unit	4 per unit
auto-punch in/out	yes	yes	yes	yes
rehearsal mode	yes	yes	yes	yes
programmable pre/post roll	yes	yes	yes	yes
built-in mixer	12 x 8 x 2, EQ, snap shot and real-time automation	no	none	6 channel, 4 aux sends, 4 stereo returns, 3-band EQ, accepts MIDI automation
type of display	240 x 64 backlit LCD, 9-digit LED	15-segment LED	15-segment LED	9-segment LED
type of metering	peak hold	peak hold	peak hold	peak hold, averaging
highest meter resolution	4dB per segment	???	2dB	3dB per segment
jog/shuttle control	rotary wheel	rotary knob	rotary knob	rotary knob
levels of undo	none	—	—	2
transport controls	start, stop, rewind, FF, record, return to 0	play, stop, rewind, FF, record, auto locate, shuttle	play, stop, rewind, FF, record	play, stop, rewind, FF, record, return to 0, locate
# of auto-locate points	40, nameable	2 (99 w/RMD remote)	2	8
auto-shuttle	yes	no	yes	yes
export markers to EDL	no	no	yes, via 9-pin	yes
synchronization	SMPTE, MTC, MIDI beat clock, video sync	SMPTE, 9-pin, MTC	SMPTE, 9-pin	SMPTE, MTC, S/PDIF
nominal sample rate	32/44.1/48kHz	44.1/48kHz	44.1/48kHz	32/44.1/48kHz
adjustable rate/ adjust range	no	yes/44.1-48kHz	yes/±6%	yes/±200 cents
digital I/O	AES/EBU, S/PDIF	AES/EBU	proprietary	S/PDIF, optical, coaxial
backup options	SCSI DAT	—	via proprietary I/O to another DA88; via AES/EBU w/IF-88 AE interface $1,149	SCSI card: $350
internal storage options	???	—	—	up to 2Gb (DPEA-31080 internal 1GB) AD-2 add'l inputs: $190;
other options	DM-80-R Remote and DM-80-F Fade included; DM-80-S Mac $650	RMD-800 remote $???; DABK-801 sync $???	remotes: RC-808 $225; RC-848 $1,599; IF-88 SD; MU-8824 meter bridge $999; SY-88 sync card $849	SMPTE card: $370

Manufacturer contact list on page 162

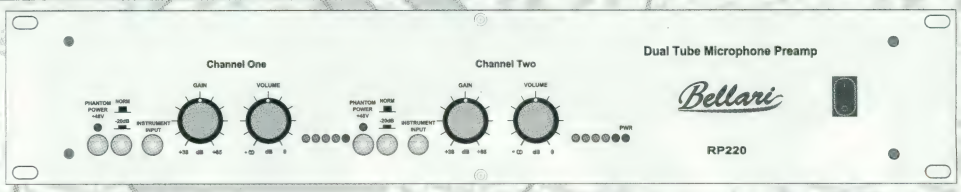
tube

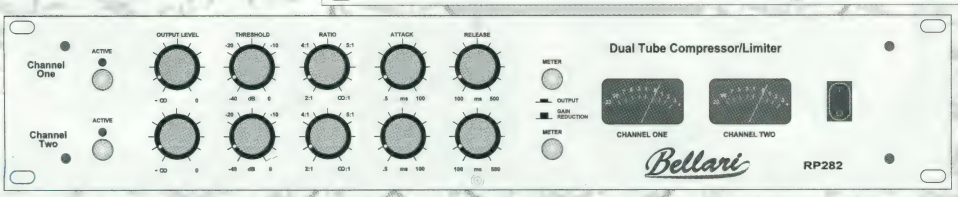
REAL SOUND



ADB3 Stereo Tube Direct Box
$ 200

RP220 Dual Tube Mic Preamp
$ 500





RP282 Dual Tube Compressor/Limiter
$ 600

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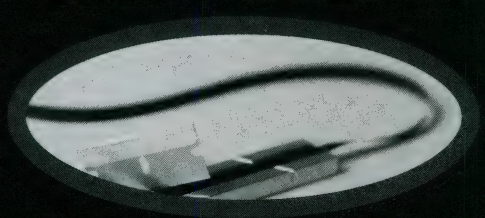
How in the world did people work before Pro Tools™?

[painfully]



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If you've checked out any of the professionally featured digital audio workstations on the market, no doubt you've seen just how much they can do. And perhaps you've also seen—once you tally up the required tangle of audio cards, DSP cards, and interfaces—that $8,000 is what a DSP-equipped professional workstation costs. Until now.

Finally, there's an intelligent alternative. Two of the audio industry's most innovative software developers have teamed up to create a powerful digital audio workstation, complete with advanced multi-effects digital signal processing *built-in*. And even better, if you own a Power Mac®, you already own all the hardware you need.

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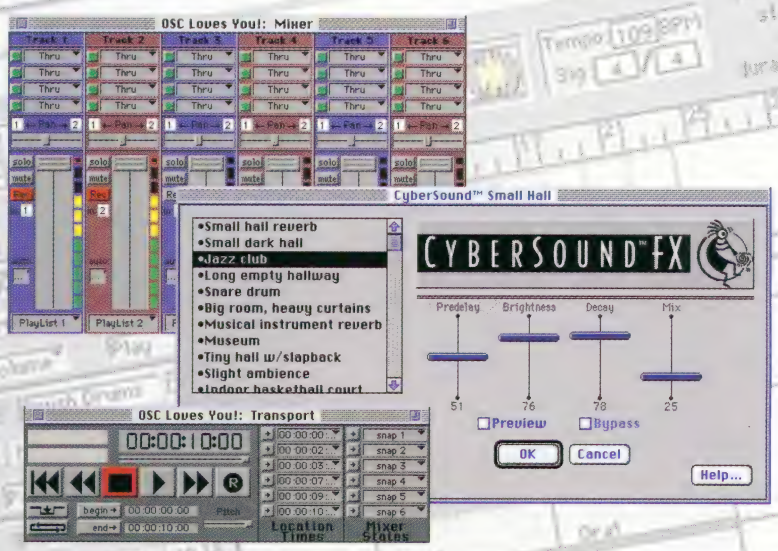

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CIRCLE READER SERVICE # 148

BUYER'S GUIDE
Effects Processors

CH...CH...CH...CH...CHANGES IN THE EF...EF...EFFECTS WORLD

BY **MARK VAIL**

While the number of drum machines and hardware sequencers has dwindled since we put together our huge December '90 Buyer's Guide, the programmable effects category has expanded — from a total of 24 to 42 machines. So have their capabilities. Thus our '96 Buyer's Guide effects chart, which begins on page 118, has expanded beyond the '90 and subsequent Dec. '92 versions, both vertically and laterally, to incorporate all the products as well as what they can do.

Besides the programmable effects chart, there's a list of preset and specialized processors beginning on page 130. There's been considerable growth here as well, from a paltry four products in 1990 to more than 20. The manufacturers of these preset and specialized processors kindly submitted almost as much technical information as we present for the programmable devices. Unfortunately, space allows us to supply only general information on them — specifically, the manufacturer and product names, a brief description of what each one does, and their retail prices.

Once you've taken a gander at the effects chart, you'll probably wonder what the heck it all means. So let's clarify some of the categories and entries.

Sample bit resolution is specified for three parts of the signal chain: the analog-to-digital conversion, the internal microprocessor, and the digital-to-analog conversion. Other factors being equal, the higher the resolution, the higher the dynamic range. Of course, there are other factors that determine a processor's sound quality. In some cases, a well designed 16-bit machine might sonically outperform a poorly designed 20-bit model. Use your ears; they're the best guide to what you should buy.

Next is the **sample rate**, which is indicated in kiloHertz (kHz). The higher the sampling rate, the higher the frequencies that can be processed and passed through the device. According to the Nyquist theorem, in order for a sampled sound to be accurately represented during playback, the sampling frequency must be at least twice that of the highest overtone in the sound. At the CD-standard sampling rate of 44.1kHz, frequencies of up to 22kHz can theoretically be reproduced.

Closely related to sample rate is **bandwidth** — the range of the frequency spectrum that the device can reproduce without a lot of dips and peaks in its frequency response curve.

Filling out the spec section of the chart is **dynamic range**, which indicates the signal-to-noise ratio for each unit. The bandwidth and dynamic range figures, provided by each manufacturer, refer to the *wet*, processed frequency response, not the dry signal. A standard full-bandwidth frequency response is 20Hz-20kHz.

Most processors provide stereo **audio ins** and **outs**, although some "stereo" effects boxes actually only pass the *dry* signal through in stereo. The left and right input signals are summed, processed, and then divided to be mixed with the dry left and right output signals. Our chart indicates whether a device has balanced or unbalanced jacks, the former as either 1/4" TRS (tip-ring-sleeve) or XLR jacks.

Units that provide **input** and **output level switches** are more flexible than those that don't, because they can more easily work in either –10dB "semi-pro" (including home studio) or +4dB pro environments. Where possible, we indicate whether the level switch is provided for the inputs, outputs, or both.

On any digital audio product, it's essential that correct input levels be maintained. If the input signal drops too low, you won't obtain the full dynamic range and sample resolution that a processor offers. On the other hand, if the signal gets too hot, you increase the chances of experiencing nasty digital clipping. To help you set the right levels, a processor should provide **input meters**. The more LED segments, the better.

Most processors offer **knobs** so that you can adjust input and output levels. Some units also provide a knob for controlling the dry/effect mix. In most cases, these knobs affect all programs (effect "patches") globally, although many processors offer programmable levels — a function that will be covered in more detail below. Knobs also appear for program selection, data entry, and various other operations as noted in the chart.

There are three entries for each unit in the **ROM/RAM programs** row: **factory**, those programs crafted by product specialists to show off the machine's capabilities (resident in the device when you buy it new); **user**, those in RAM, or random-access memory, that you can replace with your own custom programs; and **expandability**, which a handful of processors now have. Note that, for those memory-expandable machines, our specs refer only to the unexpanded unit.

Factory programs in many processors are stored in ROM (read-only memory), which means you can't overwrite them. In some cases, the factory programs are stored in RAM, and you can alter or overwrite these with your own effects. The question is, on the latter machines, can you

Continued on page 128 ►

ABBREVIATIONS

—: not applicable. **???**: information not available. **alg**: algorithm. **bal**: balanced. **BP**: bandpass. **comp**: compressor. **config**: configuration. **ctrl**: controller. **dB**: decibel. **damp**: damping. **DDL**: digital delay line. **dep**: dependent. **diff**: diffusion. **dist**: distortion. **env**: envelope. **EQ**: equalization. **ER**: early reflection. **exp**: expansion. **expd**: expandable. **ext**: external. **freq**: frequency. **ftpd**: foot pedal. **ftsw**: footswitch. **FX**: effects. **gen**: generator. **gtr**: guitar. **HF**: high frequency. **HP**: highpass. **Hz**: hertz. **I/O**: input & output. **inc/dec**: increment/decrement. **ind**: individual. **int**: internal. **kHz**: kiloHertz. **LCD**: liquid-crystal display. **LED**: light-emitting diode. **Leslie**: rotating speaker simulation. **LF**: low frequency. **LP**: lowpass. **map**: mapping. **mem**: memory. **MHz**: megaHertz. **mod**: modulation. **ms**: millisecond. **NG**: noise gate. **OD**: overdrive. **param**: parameter. **pgm**: program. **pos**: position. **prog**: programmable. **PS**: pitch-shift. **Q**: filter resonance. **res**: response. **rev**: reverb. **rtg**: routing. **sec**: second. **seg**: segment. **sep**: separate. **sim**: simulation. **simul**: simultaneous. **TRS**: tip-ring-sleeve. **unbal**: unbalanced. **VCF**: voltage-controlled filter.

Digital Effects

	Alesis MicroVerb 4	Alesis MidiVerb 4	Alesis Quadraverb 2	ART FXR Elite 424
suggested retail price	$299	$399	$799	$345
sample bit resolution	18/20/18	18/20/18	18/24/18	16/24/16
sample rate	46.875kHz	48kHz	48kHz (variable 40.4-50.8k)	44kHz
bandwidth	40Hz-20kHz +1/–3dB	20Hz-20kHz ±1dB	20Hz-20kHz ±1dB	30Hz-18kHz
dynamic range	>90dB A-weighted	>90dB A-weighted	>92dB A-weighted	78dB
audio ins & outs/ headphone jack	1/4" unbal stereo/no	1/4" unbal stereo/no	1/4" TRS bal stereo; ADAT optical I/O/no	1/4" unbal stereo/no
-10/+4dB switch	no	no	no	no
input meters	2 x 4 LEDs	in LCD	2 x 4 LEDs	clipping LED
display	LED	backlit LCD	backlit LCD	none
knobs	input, mix, output, value	value	dual concentric input level, output level, value/enter encoder	input, output, mix, A & B encoders
ROM/RAM pgms/expd mem	100/100/no	128/128/no	100/200/no	255/none/no
pgm naming	no	yes	yes	no
restore factory pgms	global	global	no	global
front-panel pgm access	value knob	value knob	encoder knob, 10-key pad	data-entry knobs (2)
simul FX/algs/rtg configs/user configs	3/32/32/no	3/32/32/no	8/33/millions/yes	4/12/18/no
reverbs	hall, room, plate, gated, nonlinear, reverse, flanged	hall, room, ambience, plate, non-linear, reverse, flanged, gated	room (4), hall (2), plate (3), chamber (2), spring, nonlinear, reverse	hall, room, plate, chamber, gated, reverse
max rev predelay/decay	250ms/135 secs	250ms/135 secs	4 secs/104 secs	not prog/15 secs
editable reverb parameters	high cut, decay	decay, LP filter, predelay, predelay mix, density, diffusion, low & high damping, gate, gate hold, gate release, swirl	decay, HF & LF damping, density, diffusion, HF rolloff, predelay, predelay mix, reflection level, reflection spread, rev swirl, gate trigger, input gate level, hold, & release	level
representative DDL FX	mono, stereo, ping-pong, tap tempo, multitap	mono, stereo, ping-pong, tap tempo, multitap, MIDI clock control	mono, stereo, ping-pong, tap tempo, multitap, MIDI clock control	slap, echo, delay, bounce
max DDL time	1,299ms	1,299ms	5 secs @ 48kHz	500ms in 5ms steps
representative modulation FX	chorus, flange, tremolo, Leslie, triggered pan	stereo chorus, quad chorus, dual mono chorus, flange, Leslie, tremolo, triggered pan	chorus, flange, phaser, Leslie, mono/stereo tremolo, triggered pan	chorus, flange, phase, pan
LFO waveforms	sine, triangle	sine, triangle	sine, square	triangle
EQ/algorithm-dependent	none/—	none/—	12 types up to 4-band parametric & 5-band graphic; chainable/yes	none/—
other FX	pitch-shift	pitch-shift	OD, mono & stereo sampling, resonator, ring mod, pitch-shift	—
max PS range	±12 half steps	±12 half steps	±4 octaves	—
detune resolution or range	1 cent	1 cent	1 cent	—
# of harmonies	2	2	4	—
prog output level	global	per pgm & global	per pgm	per pgm
prog FX/dry mix	global	per pgm w/global direct signal mute	per pgm w/global direct signal mute	per pgm
MIDI connectors	in, out/thru	in, out/thru (software switchable)	in, out/thru (software switchable)	in, out, thru
pgm chg res/map	yes/no	yes/yes	yes/yes	yes/yes
bulk dump via front panel	all data	edit buffer, pgm change table, all	all, edit buffer, ind pgms	no
real-time ctrl/all params	2 ctrls, 2 params/no	2 simul ctrls, 2 params per pgm/no	8 simul ctrls, inc MIDI, input level, local LFO, & ftsw, routable to 8 params per pgm/no	2 ctrls, 2 params/no
compare/bypass buttons	no/no	yes/yes	yes/yes	no/yes
remote functions	bypass, tap tempo, Leslie speed	ftsw: bypass, pgm adv, tap tempo, Leslie speed	bypass & pgm adv; available for tap tempo & mod sources	bypass
power supply	ext	ext	ext	ext
optional accessories	—	—	—	—
Keyboard Report	MicroVerb, Aug. '87; MicroVerb III, Dec. '92	MidiVerb II, Aug. '87; MidiVerb III, June '90 & Dec. '92	Quadraverb, May '89; Quadraverb Plus, Dec. '92	MultiVerb LTX, Dec. '92

See abbreviations on page 117

ART Effects Web 428	ART Multiverb Alpha SE 472	Digitech GSP2101	Digitech Studio Vocalist SV-5	Digitech TSR-6
$499	$575	$1,099	$1,049	$299.95
16/24/16	16/24/16	18/48/18	18/16/16	18/20/18
44kHz	48kHz	48kHz	48kHz	46kHz
30Hz-18kHz	30Hz-20kHz	20Hz-20kHz, ±.5dB	voice overtones to 20kHz; harmonies up to >6-octave range	20Hz-20kHz +0, –3dB
78dB	79dB	???	>90dB A-weighted	???
1/4" unbal stereo/no	1/4" unbal stereo/no	1/4" stereo ins, 1/4" TRS & XLR bal stereo outs; 1/4" TRS send, 2 1/4" TRS returns/yes	1/4" TRS & XLR line ins, 2 XLR mic ins; 5 1/4" TRS & 5 XLR outs; 1/4" TRS send & return/no	1/4" TRS bal stereo/no
no	no	no	input	no
clipping LED	3 LEDs	4 LEDs	4 LEDs	L/R clip LEDs
none	none	backlit LCD	backlit LCD	none
input, output, data entry	input, output	output level, data entry	input & output level, data entry, 12-button (C to B) chord/key selectors	input level, mix level, predelay, decay, output level
100/100/no	404/200/no	100/100/PPC210 card	99/99/no	99/99/no
yes	yes	yes	yes	no
global	global & per pgm	global & per pgm	per pgm	global
data-entry knob	data-entry knob, ten-key pad	pgm inc/dec, data-entry knob, FX library	data wheel, directional arrows, 8 soft keys	pgm wheel
3/26/5/no	12/72/28/no	mem dep/33/ mem dep/yes	1/1/1/no	2/???/???/no
hall, room, plate, chamber, gated, reverse	hall, room, plate, gated, reverse	mono, stereo, multi-FX, gated, stereo gated	none	hall, cathedral, plate, chamber, room, gated
125ms/12 secs	1.8 secs/25 secs	100ms/1,000ms	—/—	98ms/98ms
type, predelay, decay, HPF, LPF, damping, gate time, mix	type, decay, pos, damping, diffusion, level	ER & rev predelay, spread, shape, stereo blend, diffusion; HF decay & rolloff, room size, MF & LF levels; EQ freq, bandwidth, & gain	—	predelay, decay, level
slap, echo, delay, bounce	slap, echo, delay, bounce, loop	mono, stereo, 2-tap, 4-tap, mod delay, repeat hold, & sampler	none	delay
2 secs in 5ms steps	2 secs in 5ms steps	5 secs	—	640ms
chorus, flange	chorus, flange, pan, tremolo, phase	mono, dual, 4-phase, & stereo chorus; mono/dual flange, phaser, tremolo	vibrato	none
sine	triangle	sine, triangle, logarithmic, exponential	???	???
none/—	7-band graphic/no	double-pole HP, LP, BP, & notch filters; 6-, 10-, & 15-band graphic; 1- & 3-band parametric; 5-band parametric w/ high- & low-shelving/dep & sep	none/—	1-band parametric w/ selectable freq & adjustable Q/yes
—	—	comp, dist (3 tube, 3 solid-state), NG, auto panner, wah-wah, auto wah, whammy detune, ducker, phase inverter, arpeggiator, silencer	gender-selection, time delay (up to 80ms per voice), scooping, detune	NG
±26 half-steps	±32 half-steps	±24 half-steps	±24 half-steps	—
.06 cents	.06 cents	±100 cents	±100 cents	—
2	2	depends on number of pitch-shifters in pgm	4	—
no	per pgm	per pgm	per pgm	no
per pgm	per pgm	per pgm	per pgm	no
in, out, thru	in, out, thru	in, out, thru	in, out, thru	in
yes/yes	yes/yes	yes/yes	yes/yes	yes/no
all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system	—
3 ctrls, 3 params/yes	8 ctrls, 8 params/yes	10 ctrls per pgm/yes	6 simul ctrls global/yes	none/no
no/yes	no/yes	yes/yes	no/yes	no/no (pgm 00 = bypass)
bypass, tap tempo	bypass, inc/dec, sample/trigger	bypass, pgm inc/dec, continuous control	bypass, pgm, song, song step, & data inc/ dec	none
int	int	int	int	int
—	—	Control One foot ctrl, $299.95; PPC210 memory expansion card, $249.95	SV-I/O digital I/O option, $249	—
DR-X 2100, June & Dec. '92	MultiVerb, May '89; MultiVerb Alpha, Nov. '91	—	VHM 5 Vocalist, Nov. '92	DSP 16, Dec. '92

Manufacturers contact list on page 162

Digital Effects

	Digitech TSR-12	Digitech TSR-24S	Digitech Valve FX	Digitech Studio Quad
suggested retail price	$679.95	$799.95	$699.95	$499.95
sample bit resolution	16/16/16	18/18/18	16/16/16	18/???/20
sample rate	40kHz	48kHz	40kHz	44.1kHz
bandwidth	20Hz-20kHz –3dB	20Hz-20kHz	20Hz-20kHz +0, –3dB	20Hz-20kHz ±3dB
dynamic range	???	???	???	>90dB
audio ins & outs/ headphone jack	1/4" stereo ins, 1/4" TRS bal stereo outs/no	2 1/4" ins, 4 1/4" outs/no	1/4" TRS in, 2 1/4" TRS outs/yes	4 1/4" TS unbal/no
-10/+4dB switch	no	no	no	yes
input meters	4 LEDs	2 x 4 LEDs	4 LEDs	in LCD
display	backlit LCD	backlit LCD	backlit LCD	backlit LCD
knobs	input/output level	L & R in, main out, aux out, data-entry	output level, data-entry, presence	none
ROM/RAM pgms/expd mem	128/128/no	128/128/PPC 200 card	128/128/no	100/100/no
pgm naming	yes	yes	yes	yes
restore factory pgms	global & per pgm	global & per pgm	global & per pgm	global & per pgm
front-panel pgm access	pgm up/down, prm L/R & up/down, FX library	4 direct-access buttons, pgm up/down, prm up/down & prev/next; FX library	inc/dec buttons, data-entry knob, FX access buttons	button selectors
simul FX/algs/rtg configs/user configs	4/32/???/no	mem dep/32/???/yes	4/33/???/no	4/12/59/yes
reverbs	hall, multi-FX, gated	hall, nonlinear, mono, stereo, w/ 1-band parametric EQ, multi-FX, gated	hall, multi-FX, gated	hall, room, plate, gated, reverse
max rev predelay/decay	100ms/1,000ms	100ms/1,000ms	100ms/1,000ms	0/18 secs
editable reverb parameters	ER & rev predelay, spread, shape, stereo blend, diffusion; HF decay & rolloff, room size	ER & rev predelay, spread, shape, stereo blend, diffusion; HF decay & rolloff, room size, midrange & LF levels; bass & midrange crossover freqs, diffusion & rev levels, decay rates; 3-band parametric EQ; stereo blend; front level, back delay & level for aux audio outputs	predelay, spread, diffusion, HF decay & rolloff, room size, rev decay & level	up to 25
representative DDL FX	mono, 2-tap, 4-tap, mod delay, repeat hold, & sampler	mono, stereo, 2-tap, 4-tap, & mod delay; repeat hold	mono, stereo, 2-tap, 4-tap, mod delay, repeat hold, & sampler	slap, echo, delay, bounce, loop
max DDL time	1.4 secs	5 secs	1.4 secs	1.4 secs
representative modulation FX	mono, dual, & 4-phase chorus, tremolo, auto pan, dual flange, dual phase	tremolo, phaser, mono, dual, stereo, & 4-phase chorus & flange	mono, dual, & 4-phase chorus, mono & dual flange, phaser, tremolo, auto pan	chorus, flange, phase, tremolo, auto pan
LFO waveforms	sine, triangle, logarithmic, exponential	sine, triangle, logarithmic, exponential	sine, triangle, logarithmic, exponential	sine, triangle, square, logarithmic, exponential
EQ/algorithm-dependent	15-band graphic; 1- & 3-band parametric; 5-band parametric w/ high- & low-shelving/yes	6- & 10-band graphic; 1-, 3-, & 5-band parametric/no	10-band graphic; 4-band parametric/yes	3- & 6-band parametric; 8-, 15-, & 31-band graphic/???
other FX	dual detune, arpeggiator, NG, stereo duck-er, phase inverter	2-& 4-way auto panner, stereo NG, silencer, ducker, wah-wah, auto wah, phase inverter, BP filter, notch filter, whammy	comp, dist (3 tube), OD, NG, cabinet emulator, stereo ducker, whammy, wah-wah, auto wah, phase inverter	gate, dynamic filter, pitch-shift
max PS range	±24 half-steps	±24 half-steps	±24 half-steps	±24 half-steps
detune resolution or range	±100 cents	±100 cents	±100 cents	±50 cents
# of harmonies	1	depends on number of pitch-shift modules in alg	1	8
prog output level	per pgm	global	per pgm	per pgm
prog FX/dry mix	per pgm	per pgm	per pgm	per pgm
MIDI connectors	in, out/thru	in, out, thru	in, out	in, out/thru
pgm chg res/map	yes/yes	yes/yes	yes/yes	yes/yes
bulk dump via front panel	all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system	ind pgms, all data
real-time ctrl/all params	4 ctrls per pgm/yes	10 links per pgm, 20 global links/yes	10 ctrls per pgm/yes	8 per pgm/yes
compare/bypass buttons	yes/yes	yes/yes	no/yes	yes/yes
remote functions	bypass, pgm inc/dec, sample trigger	bypass, pgm inc/dec, sample trigger	bypass, pgm inc/dec, sample trigger	bypass, pgm inc/dec
power supply	int	int	int	ext
optional accessories	FS 300 ftsw	PPC 200 memory expansion card, $249.95; FS 300 ftsw	remote foot ctrl	—
Keyboard Report	DSP 128, May '88; DSP-128 Plus, May '89; DSP-256XL, Dec. '92	TSR-24: Mar. '94	—	—

See abbreviations on page 117

Electro-Voice DRP 15/DRP 10	Ensoniq DP/2 Parallel Effects Processor	Ensoniq DP/4+ Parallel Effects Processor	Eventide DSP4000	Lexicon Alex Digital Effects Processor
$1,398/$1,300	$995	$1,795	$4,995	$399
16/24/16	16/24/16	16/24/16	18/24/18	16/16/16
46.875kHz	39kHz	39kHz	up to 48kHz	31.25kHz
20Hz-20kHz	2Hz-16kHz	2Hz-18kHz	5Hz-22kHz	20Hz-15kHz
>90dB	96dB	96dB	>96dB	85dB
1/4" unbal stereo/no	3 1/4" ins (2 rear, 1 front), 2 1/4" outs (all TRS bal & ground compensated)/yes	XLR/1/4" Neutrick in, 4 1/4" ins, 4 1/4" outs (all TRS bal & ground compensated)/yes	1/4" & XLR stereo ins & outs; AES/EBU & S/PDIF digital I/O/yes	1/4" unbal stereo/no
yes	no	yes	software	no
10-seg LEDs	2 x 2 LEDs	4 groups of 3 LEDs	LED	level/overload LED
2 x 16-char LCD	32-char backlit LCD, 2-char LED	32-char backlit LCD, 2-char LED	240 x 64 pixel LCD	2-digit LED
input level, data-entry	2 in level, out level, data-entry	4 input, 4 output, data-entry	master level & soft keys	input, mix, output, value, pgm select
DRP15: 100/128/no; DRP10: 240/259/no	300/300/no	200/200/no	500/150/PCMCIA card	16/16/no
yes	yes	yes	yes	no
per pgm	global	global	global & per pgm	global
data-entry knob, bank/user button	inc/dec buttons, data-entry knob, select button	inc/dec buttons, data-entry knob, select button	yes	store/clear, param select, value, preset/register select
6/10/12/no	8/65/4/yes	12/54/32/yes	10/6 x 10^{25}/limitless/yes	2/7/1/no
room, chamber, hall, plate, spring, reverse, left>right, expand	small & large rooms, hall, small & large plates, 2 reverse, gated, 3 non-linear	small & large rooms, hall, small & large plates, 2 reverse, gated, 3 non-linear	small rooms, rooms, halls, plates	hall, chamber, plate, inverse, gate, chorus/delay, multitap
240ms/20 secs	450ms/250 secs	450ms/250 secs	250ms/1,000 secs	245ms/8.9 secs
level, type, room size, time, LF & HF damp, reflection, rev ratio, reflection type, cluster proportion, predelay, gate time, color, & delay	mix, volume, decay, predelay, LF decay, HF damping & bandwidth, diffusion 1 & 2, decay definition, detune rate & depth, primary send, reflection 1 & 2 times, levels, & sends, send pos, balance 1, 2, & 3, mod "stuff"	mix, volume, decay, predelay, LF decay, HF damping & bandwidth, diffusion 1 & 2, decay definition, detune rate & depth, primary send, reflection 1 & 2 times, levels, & sends, send position, balance 1, 2, & 3, mod "stuff"	all	decay, delay, level
delay, echo, loop, reverberated echoes	multi-tap, dual, tempo, loop	multi-tap, dual, tempo, loop	all	slap, bounce, echo, multitap
1,048ms	3.6 secs	3.6 secs	10 secs	1,500ms in 16 steps
chorus, flange, phaser	8-voice chorus, flange, phase, vibrato, tremolo	8-voice chorus, flange, phase, vibrato, tremolo	yes	chorus, flange
—	sine	sine	sine, triangle, square	—
HF & LF shelving/alg dep	HF & LF shelving w/ 2 parametric midrange/dep & sep	HF & LF shelving w/ 2 parametric midrange/dep & sep	varies w/ each pgm	none/—
dist, gate, Leslie, dual pitch-shift	VCF dist, gtr amp & speaker cabinet sims, Leslie, pan, fuzz box, comp, exp, de-esser, vocoder, ducker, gate, rumble filter, exciter, sine/noise generator, wah, gtr tuner, vocal remover, env gen	VCF dist, gtr amp & speaker cabinet sims, Leslie, pan, fuzz box, comp, exp, de-esser, vocoder, ducker, gate, rumble filter, exciter, sine/noise generator, wah, gtr tuner, vocal remover	modular (create your own)	—
±12 half-steps	±12 half-steps	±12 half-steps	±8 octaves	—
±50%	±99 cents	±99 cents	1 cent	—
2	2	2	8	—
per pgm	per processor	per processor	global & per pgm	per pgm
global	per pgm	per pgm	global & per pgm	???
in, out, thru	in, out, thru	in, out, thru	in, out, thru	—
yes/no	yes/yes	yes/yes	yes/yes	—/—
all data, system	all data, ind pgms, banks, system	all data, ind pgms, banks, system	all data, ind pgms, system	—
24 params/yes	8 sim ctrl, 2 params per unit/processor/yes	8 sim ctrl, 2 params per unit/processor/yes	yes/yes	—/—
yes/yes	yes/yes	yes/yes	yes/yes	no/no
on/off, up/down, A/B	bypass/kill, pgm inc/dec, tap tampo, loop, modulator, song up/down, song step up/down	bypass/kill, pgm inc/dec, tap tampo, loop, modulator, song up/down, song step up/down	bypass, pgm inc/dec, tap tempo, sample trigger	bypass, pgm inc/dec
int, universal (90-250 volts)	ext	int	int	ext
—	SW-10 dual ftsw (can use 2), $49.95; CVP-1 CV pedal, $29.95	SW-10 dual ftsw (can use 2), $49.95; CVP-1 CV pedal, $29.95	sampling options: 25 sec, $995; 90 sec, $1,995; 180 sec, $2,995; PCMCIA card	dual ftsw
Dynacord DRP 15, Dec. '92	—	DP/4, July & Dec. '92	—	Nov. '93

Manufacturers contact list on page 162

Digital Effects

	Lexicon JamMan Digital Delay/Looper	Lexicon PCM 80 Digital Effects Processor	Lexicon Reflex Dynamic MIDI Reverberator	Lexicon Vortex Audio Morphing Processor
suggested retail price	$459	$2,495	$499	$479
sample bit resolution	16/16/16	18/18/18	16/16/16	16/16/16
sample rate	31.25kHz	44.1 or 48kHz	31.25kHz	31.25kHz
bandwidth	20Hz-15kHz	10Hz-20kHz ±0.5dB	20Hz-15kHz	20Hz-14kHz
dynamic range	85dB	90dB	85dB	83dB
audio ins & outs/ headphone jack	1/4" unbal stereo/yes	1/4" TRS bal stereo; S/PDIF digital I/O/no	1/4" unbal stereo/yes	1/4" unbal stereo/yes
-10/+4dB switch	no	output	no	no
input meters	level/overload LED	2 x 5 LEDs	level/overload LED	level/overload LED
display	2-digit LED	2 x 20 plasma	3-digit LED	2-digit LED
knobs	input, mix, output, select value, select loop/alg	input, adjust, select	input, mix, output, value, pgm select	input level, param select, value, pgm select
ROM/RAM pgms/expd mem	—/—/up to 4 1Mb ZIP RAM chips for max 32 secs of delay	200/50/audio: 4Mb SIMM; data: PCMCIA RAM; software extensions: PCMCIA ROM	16/128/no	16/16/no
pgm naming	—	yes	MRC or editor req	no
restore factory pgms	—	global	global	global
front-panel pgm access	function, select, tap	up/down, load, store, pgm banks, register banks	store/clear, param select, value, preset/register select	pedal assign/tap, A/B, store, clear, preset/register
simul FX/algs/rtg configs/user configs	1/4/1/no	alg dep/10 int/alg dep/yes	2/8/???/no	6/26/5/no
reverbs	none	hall, plate, chamber, inverse, gate, infinite, multiband + rev, glide>hall, chorus/rev, res + plate	hall, chamber, inverse, gate, plate, chorus/delay, multitap, resonator	none
max rev predelay/decay	—/—	93ms/130.8 secs	245ms/8.9 secs	—/—
editable reverb parameters	—	low & mid rev times, crossover freq, predelay reflection level, reflection delays, size, diffusion, definition, depth, spin, chorus, link, rev in & out	decay, predelay, level, bass multiply, hi cut, size, predelay feedback, diffusion, reflection level & delay	—
representative DDL FX	echo, sample, 8 simul loops	tape echo, slap, non-linear, doppler, soop, etc.	slap, echo, bounce, MIDI tempo, 1/64th-whole note	tap, modulated, tape echo, auto loop, ducker, stereo, echo, Haas, etc.
max DDL time	8 secs stnd, up to 32 secs	2.64 secs stereo (up to 42 sec w/SIMMs)	1,500ms in 100 steps (1ms resolution w/editor)	1.9 secs up to 1/24th of tap tempo
representative modulation FX	—	chorus, pitch, flange, vibrato, etc.	chorus, flange	stereo chorus, phase, flange, vibrato, tremolo, rotary speaker, etc.
LFO waveforms	—	sine, cosine, triangle, pulse, etc.	—	???
EQ/algorithm-dependent	none/—	various combinations of 1- and 2-pole LP, HP, notch, & BP/yes	none/—	HP & LP/yes
other FX	—	ducker, Doppler, Leslie, dynamic filter, looping	resonance chords	pan, Leslie, dynamic filters, ring mod, resonantors, detune, morph between effects
max PS range	—	±3 octaves (optional pitch card required)	—	—
detune resolution or range	—	1 cent (±3,600 cents)	—	—
# of harmonies	—	4	—	—
prog output level	???	per pgm & global	per pgm	per pgm
prog FX/dry mix	???	per pgm & global	???	per pgm
MIDI connectors	in, out/thru	in, out, thru	in, out/thru	—
pgm chg res/map	yes/no	yes/yes	yes/yes	—/—
bulk dump via front panel	no	all, edit buffer, ind pgms	all, edit buffer, ind pgms	—
real-time ctrl/all params	all operations via MIDI pgm chg; slaves to & transmits MIDI clocks/yes	up to 10 per pgm/yes	all params in each alg simul/yes	—/—
compare/bypass buttons	no/no	yes/yes	no/no	???/???
remote functions	bypass, tap, loop on/off, sample trigger	2 switches, 1 pedal	bypass, pgm inc/dec	bypass, pgm inc/dec, tap, A/B
power supply	ext	int, universal (80-220 volts)	ext	ext
optional accessories	dual ftsw, ZIP RAM expansion	Dual FX card, $249; 4Mb SIMM expansion, dual ftsw, alg cards, preset cards, pitch card	dual ftsw	dual ftsw
Keyboard Report	Aug. '94	Apr. '95; PCM 70, Feb. '86	LXP-1, Sept. '88, Dec. '92; LXP-5, Nov. '89, Dec. '92; LXP-15, Feb. '91, Dec. '92	July '94

See abbreviations on page 117

Peavey Addverb III	Rocktron Intellifex-LTD	Rocktron Replifex	Roland RV-70 Digital Reverb	Roland SDE-330 Dimensional Space Delay
$349.99	$699	$999	$599	$1,295
18/24/16	16/16/16	16/16/16	16/16/16	16/30/16
44.1kHz	39kHz	32.2kHz	44.1kHz	44.1kHz
20Hz-16.5kHz	20Hz-17kHz	20Hz-14.5kHz	20Hz-20kHz	20Hz-20kHz
87dB	104dB Hush in, 94dB Hush out	104dB Hush in, 94dB Hush out	90dB	90dB
1/4" unbal stereo/no	1/4" unbal stereo; no	1/4" unbal stereo; no	1/4" unbal stereo/no	1/4" unbal stereo/no
no	output	output	yes	–20/+4dB
bicolor, assignable LED	5-seg LED	5-seg LED	7-seg LED	2 x 7-seg LED
16-char backlit LCD	16-char fluorescent	16-char fluorescent	2-char LED	3-char & 17-char by 2-line
input, output, 3 data encoders (param sel, param adj, preset/pgm)	input level, output level, data-entry	input level, output level, data-entry	input, effect level, 4 edit	input, balance, data-entry
128/128/no	80/80/no	none/128/no	none/199/no	100/200/no
yes	yes	yes	no	yes
global & per pgm	global & per pgm	global & per pgm	global & per pgm	global & per pgm
pgm play/load, store/execute	recall button, preset-select knob	preset-select knob	edit knobs, up/down buttons	knob, inc/dec
8/35/???/yes	4/6/multiple/no	10/2/multiple/no	3/11/11/no	3/19/19/no
hall, room, plate, gated, reverse, tunnel, spring, stage, ultra	plate, room, hall, stadium, dual	basic	room, hall, garage, non-linear, rev+delay	none
46ms/30 secs	209ms/unlimited	50ms/unlimited	400ms/32 secs	—/—
type, size, predelay, time, damp, mix level	type, input, level, decay, HF damp, LF, pan, predelay left & right, gate, gate decay & threshold, hold time	input, R&L mix, level, decay, HF damp, spillover	rev time, predelay, HF damp, density, filter, TVA env, delay level & time, ER level, LF damp	—
slap, echo, delay, mono, stereo, tap	stereo, ping-pong, 2-tap	slap, echo, delay, bounce, loop	rev+delay	stereo, 3-D, reverse, 8-tap, duck delay, non-linear
724ms	1.5 secs	1 sec	500ms	2,900ms
flange, pan, 2 sep chorus modules	chorus	chorus, flange, phase, tremolo	none	pitch-shift, mod delay
sine	none	none	—	triangle, sine, sync, inverted
5-band graphic, 4-band parametric, 3-band w/mid shift, classic EQ w/3 controls/no	none/—	4-band parametric/yes	3-band parametric/no	3-band parametric/no
comp, stereo sim, env filter, exciter, pitch-shift, speaker sim, NG, dist, OD	dynamic ducking, Hush noise reduction	comp, Leslie, auto pan, tremolo, pitch-shift, speaker sim, Hush noise reduction, channel switching	none	none
±12 half-steps	–24/+12 half-steps	–24/+12 half-steps	—	±12 half-steps
±50 cents	1 cent	1 cent	—	±50 cents
chromatic	4	1	—	4
per pgm & global	per pgm	global & per pgm	per pgm	per pgm
per pgm	per pgm	global & per pgm	global & per pgm	global & per pgm
in, out/thru	in, out/thru	in, out/thru	in, out	in, out, thru
yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
all, edit buffer, ind pgms	all data, ind pgms, system	all data, ind pgms, system	all, edit buffer, ind pgms	ind pgms, range of pgms, all pgms, system
2 ctrls, 8 params/yes	8 per pgm/yes	10 per pgm/yes	57 params via MIDI/yes	3 ctrls, 3 params/yes
yes/yes	yes/yes	yes/yes	no/yes	yes/yes
bypass, pgm inc/dec, A/B, cc, bank select, manual morphing via ftpd	bypass, pgm inc/dec via MIDI only	tap tempo for all mod FX; factory pgm ctrl w/ All Access MIDI foot ctrl	bypass int	bypass, assignable switch or continuous
ext	ext	ext	MCR-8 MIDI remote ctrl, $399;	int
—	—	All Access MIDI foot ctrl	FS5U ftsw, $39.50	FS5U ftsw, $39.50; EV-5 expression pedal, $89.95
Ultraverb, May '89; Ultraverb II, SDR 20/20, & Valverb, Dec. '92	Intellifex, Dec. '92	—	—	RSP-550, Dec. '92

Manufacturers contact list on page 162

Digital Effects

	Roland SDX-330 Dimensional Expander	Roland SE-70 Stereo Effects Processor	Roland SRV-330 Dimensional Space Reverb	RSP Technologies Intelliverb
suggested retail price	$1,195	$895	$1,295	$1,299
sample bit resolution	16/30/16	16/16/16	16/30/16	16/16/16
sample rate	44.1kHz	32 or 48kHz	44.1kHz	44.1kHz
bandwidth	20Hz-20kHz	10Hz-15kHz @ 32kHz; 10Hz-22kHz @ 48kHz	20Hz-20kHz	20Hz-20kHz
dynamic range	90dB	100dB	90dB	105dB Hush in, 94dB Hush out
audio ins & outs/headphone jack	1/4" unbal stereo/no	1/4" unbal stereo/yes	1/4" unbal stereo/no	1/4" unbal stereo; no
-10/+4dB switch	–20/+4dB	–20/+4dB	–20/+4dB	output
input meters	2 x 7-seg LED	overload LEDs	2 x 7-seg LED	5-seg LED
display	3-char & 17-char by 2-line	2-line x 16-char backlit LCD	3-char & 17-char by 2-line	16-char fluorescent
knobs	input, balance, data-entry	L/R input levels, data/value	input, balance, data-entry	input level, output level, data-entry
ROM/RAM pgms/expd mem	100/200/no	45/100/no	300/100/no	none/254/no
pgm naming	yes	yes	yes	yes
restore factory pgms	global & per pgm	global & per pgm	global & per pgm	global & per pgm
front-panel pgm access	knob, inc/dec	data-entry knob	data-entry knob, pgm inc/dec	recall button, preset-select knob
simul FX/algs/rtg configs/user configs	3/16/16/no	16/45/45/no	5/22/22/no	4/6/multiple/no
reverbs	ambience	hall, room, plate, stereo, gate, ambience	stereo, plate, stereo plate, ER, non-linear, 3-D	virtual room, plate, room, hall, stadium, dual, gated
max rev predelay/decay	—/—	400ms/60 secs	800ms/100 secs	370ms/unlimited
editable reverb parameters	—	time, predelay, ER delay & mix level, HF damp, diffusion, direct & effect levels, attack, density, HP & LP filters	time, predelay, density, LF/HF damp, ER level, time, & diffusion, TVA levels, elevation, azimuth	level, decay, HF & LF damp & rolloff, ER level, room length, width, & height, front, back, left, right, & ceiling offsets & reflections, etc.
representative DDL FX	none	delay, mod, stereo, & 20-tap delays, repeat play, sampling, reverse, 12-part pitch-shift	delay, stereo delay	stereo, ping-pong, 2-tap, etc.
max DDL time	—	2,000ms	370ms	2.5 secs
representative modulation FX	mono, stereo, 3-D, space, & multi-band chorus, 3-D panner, stereo flange, Leslie	stereo chorus, phase, flange, vibrato, panning, tremolo, wave chorus	chorus	chorus
LFO waveforms	triangle, sine, exp, OCW1-3	triangle, sine, exponential	—	none
EQ/algorithm-dependent	3-band parametric/no	5-band parametric/yes	3-band parametric/no	none/—
other FX	OD	vocoder, OD, analog dist, slow gear, rotary, auto wah, amp sim, feedbacker, bass amp sim, gtr-synth, ring mod, comp, limiter, enhancer, ducking delay, de-esser, vocal & hum cancellers, noise suppressor	gate	dynamic ducking, 4-voice pitch-shift, Hush noise reduction
max PS range	—	±24 half-steps	—	–24/+12 half-steps
detune resolution or range	±100 cents	±50 cents	—	1 cent
# of harmonies	6	12	—	4
prog output level	per pgm	per pgm	per pgm	per pgm
prog FX/dry mix	global & per pgm	per pgm	global & per pgm	per pgm
MIDI connectors	in, out, thru	in, out/thru	in, out, thru	in, out/thru
pgm chg res/map	yes/yes	yes/yes	yes/yes	yes/yes
bulk dump via front panel	ind pgms, range of pgms, all pgms, system	all data, ind pgms, system	ind pgms, range of pgms, all pgms, system	all data, ind pgms, system
real-time ctrl/all params	5 ctrls, 5 params/yes	4 ctrls, 4 params/alg dep	5 ctrls, 5 params/yes	8 per pgm/yes
compare/bypass buttons	yes/yes	no/yes	yes/yes	yes/yes
remote functions	bypass, assignable switch or continuous	bypass, pgm inc/dec, sample trigger	bypass, assignable switch or continuous	bypass, pgm inc/dec via MIDI only
power supply	int	ext	int	ext
optional accessories	FS5U ftsw, $39.50; EV-5 expression pedal, $89.95	FC-50 MIDI foot ctrl, $245; EV-5 expression pedal, $89.95; FS5U ftsw, $39.50; PCS-31 ch insertion cable, $31.50	FS5U ftsw, $39.50; EV-5 expression pedal, $89.95	—
Keyboard Report	—	Boss SE-50, Jan. '91 & Dec. '92	SRV-2000, Feb. '86	Dec. '92

See abbreviations on page 117

Sony DPS-V77	Sony HR-MP5	Sony HR-GP5	Symetrix 602 Stereo Digital Processor	TC Electronic M5000
$1,775	$595	$595	$1,995	$4,881
24/32/20	18/18/18	18/18/18	18/24/18	18/???/18
48kHz analog; 44.1 & 48kHz digital	48kHz	48kHz	44.1 or 48kHz	44.1 or 48kHz
10Hz-22kHz	20Hz-20kHz	20Hz-20kHz	12Hz-20kHz	10Hz-22kHz
>96dB	>92dB	>96dB	>104dB	>98dB
2 1/4", 2 XLR; digital I/O/no	1/4" unbal stereo/yes	1/4" unbal stereo (1 in on front)/yes	XLR bal stereo; AES/EBU & S/PDIF digital I/O/no	XLR bal stereo/no
–20/+4 on 1/4" jacks	no (–10dB)	no	no	no
2 multi-seg LEDs	???	???	10-seg LED	2 10-seg LEDs
backlit LCD, 2-char LED	backlit LCD	backlit LCD	4-char LED	2 x 40-char LCD
dual concentric input, 1 output, jog/shuttle	2 input, headphone, 2 data-entry	input level, headphone, 2 data-entry	input gain, data-entry	4 data-entry soft knobs, pgm select
198/198/no	100/100/no	100/100/no	128/128/no	150/100/index RAM to 64k; SIMMs 16Mb x 24-bit
yes	yes	yes	by number	yes
global & per pgm	global	global & per pgm	global & per pgm	global
10-key pad, inc/dec & 6 prog direct-access buttons, data-entry knob	6 direct-access buttons, data-entry knob	inc/dec & confirm buttons, data-entry knob	data-entry knob	data-entry knob, enter button
4/50/5/yes	???/51/5/yes	7/???/38/yes	6/3/open/yes	2/16/1/no
hall, room, plate, gated, spacious	hall, room, plate, gated	hall, room, plate, gated	none	hall, room, non-linear, gated, plate
pgm dep/pgm dep	pgm dep/pgm dep	pgm dep/pgm dep	—/—	200ms/30 secs
???	???	???	—	decay ratio, diffuse crossover, predelay, distance, HF cut, mod rate, diff type
stereo, double, multitap, tempo, loop, mono, mod, ping-pong, hold, pan pot, dimension	tapped, double, hold, tempo, sweep	stereo, tapped, double, tempo, hold	slap, echo, delay	slap, echo, delay
???	???	???	330ms	625ms (1.25-sec option)
chorus, flange, phase	chorus, flange, phase, vibrato, tremolo, auto pan, ensemble, ring mod	chorus, flange, phase, vibrato, tremolo	chorus, flange, phase, vibrato, tremolo	chorus, flange
???	sine, triangle	???	sine, triangle, random	sine
2-band parametric, shelving/dep & sep	varied types/no	???/dep & sep	3-band parametric/no	4-band parametric/no
comp, dynamic filter, gates, ducking, sound effects, vocal canceller, combo effects	ducking, comp, amp sim, limiter, gate, subharmonic gen, pitch-shift, reverse	ducking, comp, dist, OD, limiter, gate, panning, amp sim, ring mod	comp, limiting, de-essing, noise reduction	none
4 octaves	4 octaves	4 octaves	—	±12 half-steps
???	±100 cents	???	—	1 cent
7	7	7	—	2
global & per pgm	per pgm	per pgm	global & per pgm	per pgm
global & per pgm	per pgm	per pgm	global & per pgm	per pgm
in, out, thru	in, out	in, out	in, out/thru	in, out, thru
yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system	all data, ind pgms, system
6 per pgm/???	4 per pgm/no	4 per pgm/???	all params/yes	all params simul/yes
yes/yes	yes/yes	yes/yes	yes/yes	yes/yes
bypass, pgm inc/dec, tap tempo, sample trigger	MIDI only	ftpd inputs	Mac librarian & remote ctrl	bypass
int	ext	ext	int	int
RK-V77A AES/EBU & RK-V77S S/PDIF digital cables	HR-205 foot ctrl, HR-RK5 rack ears	HR-RC5 remote ftpd, $150; HR-RK5 rack ears	—	additional stereo processor, $2,258; Digital Tools & Compression option, $818; ATAC remote ctrl
DPS-M7 & –R7, Dec. '92; DPS-D7, Feb. '93; DPS-F7, Sept. '93	Apr. '95	—	—	—

Manufacturers contact list on page 162

Digital Effects

	TC Electronic TC 2290	Yamaha REV5	Yamaha REV100	Yamaha SPX990
suggested retail price	$2,914	$2,199	$299	$1,179
sample bit resolution	1/???/???	16/16/16	16/16/16	20/20/20
sample rate	1MHz	44.1kHz	44.1kHz	44.1kHz
bandwidth	20Hz-20kHz	20Hz-20kHz	20Hz-20kHz	20Hz-20kHz ±0.5dB
dynamic range	>100dB	>78dB	80dB	106dB
audio ins & outs/headphone jack	1 in, 2 out (XLR & 1/4")/no	XLR & 1/4" TRS bal stereo/no	1/4" unbal stereo/no	XLR & 1/4" TRS bal stereo/no
-10/+4dB switch	no (1/4" –10dBu, XLR +4dBu)	yes	no	input & output
input meters	5-seg LED	8-seg LED	2 peak LEDs	2 8-seg LEDs
display	4-char & 4 2-char LEDs	16 x 2-char LCD	2-char LED	24-char x 2-line LCD; 2-char LED
knobs	input level	input level, 3-band sweepable EQ, mix	input level, mix bal, delay, decay, output level	2 input level, data-entry
ROM/RAM pgms/expd mem	24/75/dynamic RAM to 32 sec	30/60/no	99/99/no	80/100/RAM card
pgm naming	no	yes	no	yes
restore factory pgms	global	per pgm	global	per pgm
front-panel pgm access	inc/dec button, 10-key pad	10-key pad, direct-recall buttons	inc/dec buttons	data-entry, page up/down, 6 multi-function buttons
simul FX/algs/rtg configs/user configs	3/1/1/no	3/12/9/no	2/6/2/no	3/36/4/yes
reverbs	none	many types	hall, room, plate, gated	hall, room, plate, gated, vocal, reverse gate, snare & drum machine
max rev predelay/decay	—/—	1,000ms/99 secs	99ms/9.9 secs	200ms/480 secs
editable reverb parameters	—	rev time, high & low EQ, diff	alg dependent; typically predelay, rev time, & level	alg dependent; typically type, time, initial delay, diff, ER, bal, etc.
representative DDL FX	delay, gated echo, ducked echo	delay, stereo echo	stereo & mono delays w/ & w/o repeats	delay, doubler, multi-tap delay, freeze
max DDL time	3,000ms	2,900ms	740ms	1,480ms
representative modulation FX	chorus, flange, phase, vibrato	flange, chorus, phase, tremolo, symphonic, pitch-shift	flange, chorus, tremolo, symphonic, organ cabinet	chorus, flange, phase, auto pan, symphonic
LFO waveforms	sine, random sine, env	sine	sine	sine
EQ/algorithm-dependent	none/—	analog 3-band sweepable, digital 2-band/analog sep, digital per pgm	none/—	3-band parametric, pre- or post effect/no
other FX	none	gated rev	none	comp, dist, harmonic driver
max PS range	—	±12 half-steps	none	±2 octaves
detune resolution or range	—	±100 cents	—	±100 cents
# of harmonies	—	2	—	3
prog output level	global & per pgm	per pgm	per pgm	per pgm
prog FX/dry mix	global & per pgm	front-panel knob	front-panel knob	per pgm
MIDI connectors	in, out, thru	in, out/thru	in	in, out/thru
pgm chg res/map	yes/no	yes/yes	yes/yes	yes/yes
bulk dump via front panel	all data, ind pgms, system	all data, ind pgms, system	no	all data, ind pgms, system
real-time ctrl/all params	no/—	2 ctrls per pgm/yes	8 simul ctrls, 7 per pgm/yes	2 ctrls, typically 6 per pgm/yes
compare/bypass buttons	no/yes	no/yes	no/no	yes/yes
remote functions	tap tempo, sample trigger	pgm inc/dec, bypass	none	pgm inc/dec, trigger
power supply	int	int	ext	int
optional accessories	FATR fast trigger sampling, $589; ME00 mem exp, $317; 0144 foot ctrl, $630; remote ctrl	FC5 ftsw, $17.95	—	MCD32 mem card, $99.95; FC7 foot ctrl, $59.95; FC5 ftsw, $17.95
Keyboard Report	—	REV7, Feb. '86	EMP100 & EMP700, Dec. '92	SPX900, May '89 & Dec. '92

See abbreviations on page 117

Yamaha SPX1000	Zoom 9050
$1,829	$799.99
16/16/16	16/16/16
44.1kHz	???
20Hz-20kHz	???
90dB	???
1/4" unbal stereo; proprietary digital I/O/no	1/4" unbal stereo/yes
input & output	no
2 8-seg LEDs	LED
16-char x 2-line backlit LCD; 2-char LED	20 x 2-char fluorescent
2 input level	input & output levels, 4 data-entry
40/59/no	none/198/no
yes	yes
per pgm	global & per pgm
4 buttons	pgm up/down
5/???/3/yes	8/55/4/no
hall, room, plate, gated, vocal, reverse gated	hall, ER, ducking
1,000ms/480 secs	100ms/10 secs
alg dependent; typically type, time, initial delay, diff, ER, bal, etc.	rev time, predelay, color, mix, destination, source, ratio
delay, doubler, multi-tap, freeze	ping-pong, multi-tap, delay & pitch
5,200ms	1,000ms
chorus, flange, phase, auto pan, symphonic	chorus, flange, phase, vibrato, tremolo, auto pan
sine	triangle, saw up/down
2-band parametric/yes	4-band, 3-band, enhancer, parametric/no
comp, exp, aural exciter	com, limiting, dist, OD, Leslie, auto pan, dynamic filter, tremolo, slow attack, delay-pitch + ducker, amp sim, enhancer, harmonized pitch-shift, wah, comb filter
±2 octaves	±12 half-steps
±100 cents	±50 cents
3	2
per pgm	per pgm
per pgm	per pgm
in, out/thru	in, out/thru
yes/yes	yes/yes
all data, ind pgms, system	all data, system
2 ctrls, typically 6 per pgm/yes	2-5 params per pgm
yes/yes	yes/yes
pgm inc/dec, trigger, analog audio trigger input (switchable mic/line)	pgm chg, effect on/off, real-time mod
int	ext
FC7 foot ctrl, $59.95; FC5 ftsw, $17.95	8050 foot ctrl, $249.99; FC50 foot ctrl, $114.99; FP01 ftpd, $49.99
Dec. '92	9010 & 9030, Dec. '92; 9001, May '93

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Manufacturers contact list on page 162

◀ Continued from page 117

restore the factory RAM programs? If the answer is yes, can you restore single programs, or only all of them at once? Where possible, we answer these questions for you.

Front panel program access refers to how you move from one memory location to another on the unit itself. One processor might offer increment/decrement buttons, while another permits fast scroll, or even random access using a numeric keypad.

Some effects devices can perform multiple digital signal processing (DSP) tasks at once. These are identified by a number in the **simultaneous effects** row, which indicates how many effects can be active at once. The number of **effects algorithms** and **routing configurations** is also specified for multi-effect programs, as is information on whether you can alter the order of active effects in the effects chain or the arrangement is fixed.

In the **reverbs** row, you'll find out what kind of virtual environments, if any, are provided, such as hall, plate, chamber, and room. We also let you know in the chart which units offer gated, reverse, and other types of synthetic reverb effects.

One of the key reverb parameters is the **maximum predelay** time. Predelay lets you forestall the onset of the reverb effect for a predetermined amount of time. This allows the attack of your source signal to be heard before it gets bathed in reverberated sound waves. Predelay also helps define the apparent size of a simulated space. The reverb **decay** parameter determines the length of time that will elapse before reverberations fade away to nothing.

Other reverb parameters are revealed in **editable reverb parameters**. When we ran out of room to list all the effects offered by a particular device, we stooped to using "etc."

The kind of delay and echo effects available are detailed in **representative DDL FX**. For example, *multi-tap* indicates that a processor lets you set separate delay times for the left and right channels. **Maximum DDL time** tells you how long an echo you can create (without feedback).

Signal processing functions such as chorusing, flanging, phasing, and pitch-shifting are known as modulation effects, so naturally we list these under **representative modulation effects**. The modulation sources for these effects are **LFO waveforms**, and the type of modulating waveform used can drastically alter the resulting effect. Although *sine* and *triangle* waves are most common, some machines offer a wider variety of possible waveforms.

EQ is provided as a distinct effect on some processors; it's part of particular effects algorithms on others. EQ ranges from simple low-pass filtering to full-blown parametric and graphic equalization. Our grab-bag category for miscellaneous tools like compressors, panners, exciters, expanders, noise gates, distortion, and so on is **other effects**.

We define pitch transposition as the ability to move a note more than a whole-step up or down from its original frequency. Our chart shows transposition **range** and the number of **harmony** parts a unit can generate. Some manufacturers provided us with **detune range** figures instead of the **resolution** number we were seeking. If the value in this field is ±50 or 100 cents, it describes the range; a 1 cent entry means that's the resolution.

If a device features a **programmable output level**, it usually means the master level is stored for each effect patch. Wet-to-dry mix may also be programmable, as noted in the **programmable effects/dry mix** row.

What kind of **MIDI ports** — if any — does each processor offer on its rear panel? On some models, a single jack might be switchable, using a hardware or software switch, between out and thru operation. All units with MIDI jacks in this roundup are capable of responding to **MIDI program changes**. For optimum memory management, some units offer **program change remapping**, which means you can access your favorite multi-effect patch using many different program change numbers without copying the patch to multiple memory locations.

If a machine is capable of performing a **MIDI bulk dump**, you should be able to save your effects patches via system-exclusive to a computer or data storage device. Better effects devices let you dump and retrieve individual patches as well as the entire memory contents.

More MIDI questions: Does the unit respond

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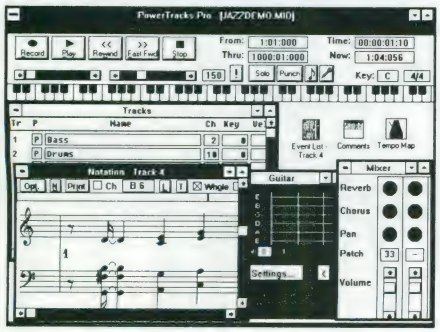

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PowerTracks for DOS *- DOS 3.3 or higher, 640K, XT/286/386 or better. MIDI interface (Roland MPU401, Music Quest MQX series, SoundBlaster MIDI and FM sounds, Midiator, Roland SC7, Yamaha TG100) or Adlib/SoundBlaster compatible sound card.*

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Digital Effects

to continuous controller messages, also known as **MIDI real-time** control? If so, how many simultaneous controllers will it respond to? Check out this row of the chart for the answer.

Here are a couple of handy items too often missing on programmable devices: **edit/compare** and **bypass** buttons. While the former allows you to switch between a patch that you're editing and one stored in the machine to evaluate your work, the latter lets you toggle between the processed and dry sounds. This function might also be accessible via an input for a **footswitch**, which may also be used to control the DDL's echo rate (tap tempo) or the speed of a Leslie simulator.

Preset & Specialized Effects

Aphex Systems Model 104 Aural Exciter Type C², stereo audio enhancer w/ Big Bottom, $349 (see Keyboard Report, Feb. '93).

ART MR-1/120, digital reverb, $179.

ART FXR/423, stereo digital multieffects (reverb, delay, chorus, flange, & pan), $259.

Behringer Ultrafex EX 3100, stereo multiband sound enhancer w/ noise reduction & stereo surround, $299.99.

Behringer Ultrabass EX 1000, stereo subharmonic synth, $279.99.

Behringer Edison EX 1, stereo image enhancer, $279.99.

Behringer Dualfex II Model EX 2000, stereo multiband sound enhancement processor, $219.99.

dbx 120XP, stereo subharmonic synthesizer, $299.95 (see Keyboard Report, April '94).

Digitech MIDI Vocalist MV-5, stereo-output four-part vocal harmony processor w/ MIDI, $499.95 (see Keyboard Report, VHM 5, Nov. '92).

Digitech RPM-1, stereo-output vacuum tube Leslie simulator, $569.

Electro-Voice Fx70, programmable stereo Leslie simulator w/ room simulations, programmable distortion, & MIDI, $1,190; FS223 footswitch, $75 (see Keyboard Report, May '95).

EMS Vocoder 2000, 16-channel analog vocoder, $1,900.

EMS Vocoder 3000, 16-channel analog vocoder w/ attenuators, $6,000; balanced inputs & outputs, $650.

Fender '63 Reverb, classic spring reverb, $469.97.

Furman Sound Punch-10 Bass Enhancement System, stereo subharmonic synthesizer, $299; balanced version, $369.

Korg/Toneworks G4, stereo Leslie simulator, $450 (see Keyboard Report, May '95).

Motion Sound Pro-3, hybrid Leslie simulator w/ rotating horn assembly, stereo electronic bass rotor simulation, variable distortion, & dual footswitch for speed control/braking, $699 (see Keyboard Report, May '95).

Oberheim Echoplex Digital Pro, real-time digital performance tape-loop simulator w/ MIDI, $799; EFC-7 foot controller, $129; 4Mb version, $1,295 (see Keyboard Report, July '95).

Rolls/RFX RP147 Rotorhorn, stereo Leslie simulator w/ stereo chorus & MIDI, $199.99.

TC Electronic SCFA, stereo-output chorus, flanger, & pitch-modulator, $399.

TC Electronic TC 1210, stereo chorus, flanger, & spatial expansion processor, $1,684.

Voce Spin, stereo Leslie simulator w/ overdrive & MIDI, $449 (see Keyboard Report, May '95).

Zoom Studio 1202, stereo reverb & modulation processor, $249.99. ■

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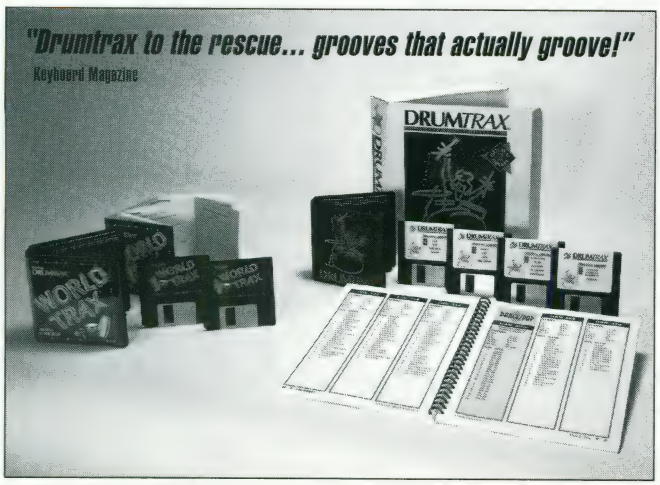

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IF YOU CAN FIND ANOTHER SYNTH THAT SOUNDS THIS GOOD,* IS THIS EASY TO USE, FEATURES 6 EFFECTS PROCESSORS AND STARTS AT UNDER $2,000,** BUY IT.

We'll save you some time. There is not another synth that sounds as good or is as **EASY TO USE** as the Yamaha W5/W7. Period. And there isn't a synth anywhere near $2,000 that gives you 6 DSPs for up to 10 simultaneous effects. (That's the whole story. You don't even need to read the rest of this ad. Go out now and get a W5 or W7.)

The same 32-note polyphony, 16-part multi-timbre synthesizer is available as the 76-key W5 ($2,495 MSRP) and the 61-key W7 ($1,995 MSRP).

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For instance, in the mixer you'll apply the W5/W7's digital effects to both individual voices and the overall mix. For the first time, you're able to keep your wet voice effects and overall mix effects and stay true to your musical vision. **NO COMPROMISES.**

(These are many of the same effects you'll find on the Yamaha SPX990, a dedicated, top-of-the-line digital effects processor.)

A second feature that makes the W5/W7 so easy is the programming templates. Why run around doing "leg work" when the W5/W7 already provides you with 171 ready-made combinations of amplitude envelopes, filters, pitch envelopes and LFOs.

A third W5/W7 easy service is the **FREE** voice editing software for Macintosh® computers. Dig down deep and change just about anything you want with ease. There's no end to the control you can take.

You can also add more superb voices using the W5/W7's expansion port. Optional *Grand Piano*, *Vintage Sounds*, and *Rhythm Section* cards each add 4MB of WaveROM to the 8MB on the W5/W7.

One last thought before you get in the car. The W5/W7 interface is exceptionally shallow. Virtually every feature, voice and effect can be applied with no more than two key strokes. So **MAKING MUSIC** takes precedence over using a synthesizer.

Naturally, there's lots more to the W5/W7. So ask your local Yamaha dealer. Or download information now from America Online (Keyword SSS→ Industry News→Yamaha→ Color Brochures Folder→ Synthesizers).

You can look a long, long time for another synth with all the features, the **EASE OF USE**, the sound quality and the price of the Yamaha W5/W7 synthesizer. (And you won't find it.) Or you can just go to your Yamaha dealer and start making music today.

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For more information on the W5/W7, call (800) 932-0001 Ext. 620. © 1995 Yamaha Corporation of America, Digital Musical Instrument Dept., P.O. Box 6600, Buena Park, CA 90622
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- 4 mono mic/line chs.
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- 4 stereo line chs.
- 2 aux sends per ch.
- 2 stereo aux returns
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- Efx return to monitor
- Aux 1 pre/post switch
- 3-band EQ w/Low Cut filter
- Mutes on every channel
- 4 buses via Mute/ALT 3-4
- Easy metering via PFL Solo
- Control Room monitoring
- Headphone output
- 4 channel inserts
- XLR & 1/4" outputs
- Multi-way metering
- Sealed rotary controls
- Built-in power supply

A DOZEN NEW WE JUST MADE

? WHAT IS VLZ? *VLZ stands for Very Low Impedance. Originally developed for our 8•Bus consoles, it's a unique Mackie approach to circuit design that reduces thermal noise and seriously cuts down on crosstalk. The end result is that VLZ design cuts circuit thermal noise in half! VLZ demands high current — which requires a beefy power supply. So we give you one — and it's internal, too. (No clumsy wall-warts!)*

1 60dB GAIN *on first 4 chs. via balanced XLR mic inputs.*

3 ALL INPUTS & OUTPUTS BALANCED *(except RCA-type tape inputs). Balanced lines let you run long cable distances (longer than 15 ft.) with minimal hum and buzz. For short cable runs you can also use unbalanced lines, if ya got 'em.*

4 EFX TO MONITOR *switch and level control on Aux Return 1. When you're using the output of Aux Send 1 to feed stage monitors, you can now blend reverb or other effects back into the Aux Send 1 monitor mix, just like with our SR Series.*

5 Global AUX 1 PRE/POST *switch. Aux Send 1 on each channel can be pre-fader/pre-EQ (great for stage monitor mixes), or post-fader/post EQ (for effects in the studio).*

6 CONTROL ROOM/PHONES SECTION *with level control. A mini-version of a popular 8•Bus feature, that adds boocoo monitoring, mixdown and metering flexibility. Separate switches let you select any combination of Main Mix, Tape In and Alt 3-4 signals for routing to the Phones and Control Room outputs and meters. Perfect for creating custom headphone mixes, monitoring tape levels, etc. Plus, an extra button lets you re-route this multi-source signal back to the main mix!*

! LEVEL SET MARKER *When used with PFL/SOLO, the level set procedure gives you low noise, maximum headroom and best dynamic range every time! No more guessing about how to set your gain trims, no more worrying about internal clipping!*

2 PFL SOLO *makes level setting easy. Just push a solo button, watch the famous Rude Solo LED start blinking, and adjust the trim control (ch. 1-4) for OdB on the meters. Solo also replaces your source selection, feeding the control room and phones (see 6). It's great for previewing or cueing a signal prior to adding it into the mix. And remember, this solo is non-destructive. It doesn't interrupt the main left/right, 1/4" TRS or XLR outputs.*

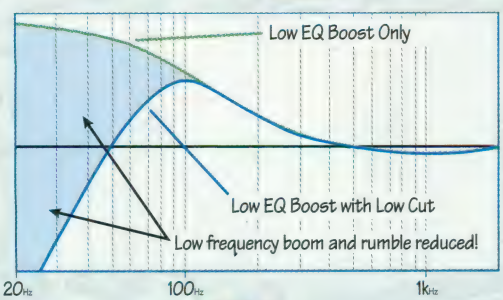
MS1202 VLZ

12x2 MIC/LINE MIXER

FEATURES AND 8-BUS VLZ CIRCUITRY. THE CLASSIC MS1202 MIXER EVEN BETTER.

7 3-BAND EQ *on all chs. You asked for it. Musical EQ at 12kHz, 2.5kHz and 80Hz, like on our CR-1604 & LM-3204.*

8 LO CUT FILTER *(Chs. 1-4). With the exception of bass guitar, low frequency synth sounds and kick drums, almost all sound is in the audio range above 75Hz. Our Lo Cut Filter reduces or eliminates unwanted frequencies below 75Hz. It's great for cleaning up the "mud" in recording and live sound work, and also lets you boost lower vocal ranges without increasing stage rumble, bass guitar, etc. It's like having a second Lo EQ control centered at a higher frequency.*



11 A MUTE ON EVERY CHANNEL PLUS AN EXTRA STEREO BUS! *As on our CR-1604, pressing a MUTE switch UNassigns the channel from the main L/R bus and reassigns it to the Alt 3-4 output. You can create two stereo pairs for output to a 4-track, bounce multiple tracks onto 2 more tracks, or preview a source that's not in the main mix yet.*

9 BALANCED XLR MAIN OUTPUTS *(along with balanced 1/4" TRS output jacks). XLR outputs have a switchable 30dB pad to match the input sensitivity of camcorders and other mic level inputs.*

10 RCA TAPE LOOP INTERFACE *provides convenient hookup to tape decks and other devices.*

12 VIRTUAL PAD *on first 4 channels' line inputs. 10dB attenuation with trim all the way down; Unity at 9:00 instead of 12:00 so you can add even more equalization to already-hot signals.*

For 5 years, our Micro Series 1202 12-ch. mixer has toured with superstars, gathered network news, pinch-hit next to mega-consoles... and has been the ultra-reliable main mixer in a lot of home studios.

All that time, we've been reading warranty cards for suggestions on how we could improve the MS1202.

This is the result. Same great value. Same rack-mountable, built-like-a-tank construction. But with some exquisitely handy new goodies that make it an even more effective tool for both recording and live performance.

Visit your Mackie dealer (the MS1202 VLZ's in stock right now) or call us toll-free for detailed information.

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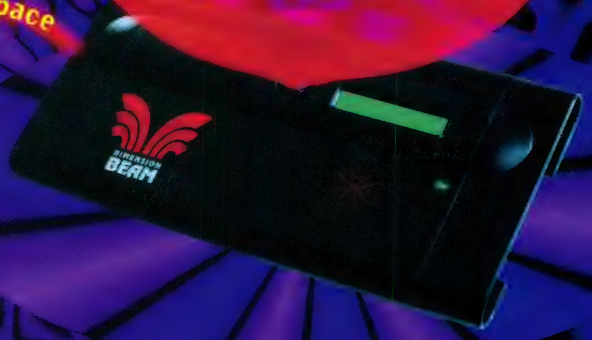

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Dimension BEAM™

BUYER'S GUIDE

Mixers/DATs

BY **RANDY ALBERTS & DEBBIE GREENBERG**

MIXERS

Assuming you've spotted, in these pages, more than one device that you'd like to add to your *noise-making* rig, you're going to need a mixer. So. . . . While it's true that countless *Keyboard* readers own studios equipped with 24-channel (or larger) boards, due to lack of space, we were forced to limit our coverage of mixers to those with eight buses or fewer. We focused on the most vital statistics: the number of channels, bus outputs, auxiliary sends, and stereo returns. The list is organized in alphabetical order by manufacturer, with each of their product lines arranged by price.

Since mixers are rather feature-laden beasts, we have to apologize for the bare-bones nature of this list. Midway through the process, one manufacturer pointed out that we should have included tape returns as well. True enough — but it was too late to send out a whole new set of questionnaires. So treat the information below as a starting point in your search for the right mixer. Contact the manufacturer (see the address list on page 162) to obtain a mixer's complete specs. Despite repeated requests, a few manufacturers did not send us any information on their mixers, so we were not able to include them.

KEY:
number of channels/bus outputs/auxiliary sends/stereo returns, retail price

Alesis
X2: 24/8/8/8, $9,999

Allen & Heath
GR1-Zone Mixer: 6/3/0/0, $995
GL2: 10 mono, 2 stereo/4/6/4 mono, $1,595
GL3: 16-32, expandable to 40/4/6/4, $3,995-$5,995
GL4: 24-40/8/10/8, $7,995-$13,995

AMEK U.S. Operations
TAC B2: 16, 28/4/6/4, $9,143, $13,453
TAC Bullet: 16, 28/8/6/6, $10,467, $14, 564

ART (Applied Research and Technology)
Phantom 2408: 24 input,16 channel/4/8/0, $1,199

Ashly Audio
LM-308: 8 stereo, 16 mono/3/2/2, $399.99
MM-106: 6/3/0/0, $599.99
MM-508: 8/3/2/2, $1,199.99

Audio Centron
Equinox ACM1262: 6 mono, 3 stereo/2/2 (1 Pre, 1 Post)/2 sets, $400

Behringer
MX 602: 2 in/6 out splitter, 8 in/2 out mixer, 6 in/6 out amp buffer, $279.99

Carvin
CX-Series (rack): 4, 6, 8, 12/2/2/2, $499-$1,399
DX-Series: 16, 24/4/4/3, $1,795-$2,295

D&R North America
Vision: up to 128/8/8/as many as you want, $8,000 and up
Orion: up to 32/8/8/16, $16,000 and up

DDA
DDA Interface: 8, 16, 24, 32, 40/4/6/2, $4,000 and up
FMR: 24, 32, 40, 48/8/6/2, $14,000 and up

DOD Electronics
822 XL/RM: 8/0/2 effect, 1 monitor/1, $449.95
1222 XL/RM: 12/0/2 effect, 1 monitor/1, $599.95

Fender
MX-5200 Series: 8, 16, 24, 32/4 group outs, stereo, 1 mono/6/4 stereo or mono, $1,979.99-$3,259.99

Fostex
812/8: 8/8/2 mono, 1 stereo/3, $849
812: 12/8/2 mono, 1 stereo/3, $1,095

Furman Sound
MM-4A: 4 (mono)/1/1/1, $339
MM-4AB: 4 balanced (mono)/1/1/1, $379
MM-8A: 4 (stereo)/2/1/0, $399
MM-8AB: 4 balanced (stereo)/2/1/0, $445

Generalmusic
Pick Pad: 6 mono, 2 stereo/2 pairs of stereo outs/1/1, $399
Groove 14 + 6: 14 mic line, 6 stereo line/L&R, mono, four group/6/6 plus 14 inserts, $2,825
Groove 20 + 8: 20 mic line, 8 stereo line/L&R, mono, four group/6/6 plus 20 inserts, $3,495
Groove 28 + 8: 28 mic line, 8 stereo line/L&R, mono, four group/6/6 plus 28 inserts, $4,325

JLCooper Electronics
MixMaster (MIDI-controlled): 8/8 x 2/0/0, $499.95

Kawai America Corp.
MX8BR: 8/2/2/2, $425
MX8SR: 8 stereo/2/2/2, $595
MX16: 16/2/3/3, $795

Mackie Designs
MS1202: 4 mono, 4 stereo/2/2/2, $399
LM3204E (Channel Expander): 16 stereo/uses main board buses/4/4, $899
LM3204: 16 stereo/4/4/4, $999
CR1604: 16/4/7/4, $1,099
24E (Channel Expander): 24/uses main board buses/6/uses main board, $2,999
16•8: 16/8/6/6, $3,799
24•8 Bus: 24/8/6/6, $3,999
32•8 Bus: 32/8/6/6, $4,999

Mark of the Unicorn
MIDI Mixer 7s (MIDI-controlled): 7 stereo/2/2 stereo/2, $695

Midiman
MiniMixer (battery-powered): 8/1 stereo/0/0, $99.95
MultiMixer 6: 6/1 stereo and headphone stereo/0/0, $99.95
MicroMixer 18: 24/1 stereo and headphone stereo/12 stereo sends/1 stereo return and 1 mono return, $299.95

Niche
ACM Audio Control Module (MIDI-controlled): 8/8/0/0, $499
Automation Station (MIDI-controlled): 16/16/0/0, $699

Peavey Audio Media Research
RSM 2462: up to 40/2/6/4, $1,699.99
PS 2482: 24/8/8/8, $4,999.99

Peavey Electronics
LM 8S: 8/2/1/0, $249.99
LM 16S: 16 (line inputs - stereo)/2/1/0, $399.99
Unity 500: 14/2/2/3, $349.99
Unity 1002: 8, 12/2/2/2, $399.99, $499.99
Unity 2002: 12, 16, 24/2/4/3, $599.99, $749.99, $899.99
RSM 1662: 16/2/6/6, $1,699.99
SRC 1600: 16/6/6/6 (mono), $1,999.99
SRC 2400: 24/6/6/6 (mono), $2,699.99

Phonic Corp.
MM122: 12/2/2/2 stereo, $349
PMC 802B: 8/2/3/1 (dual mono), $599
PMC 1202B: 12/2/3/1 (dual mono), $819
PMC 1602B: 16/2/3/1 (dual mono), $999
PMC 2402B: 24/2/3/1 (dual mono), $1,299
PMD 800: 10/2/2/2, $1,299
M1642: 16/4/6/2 (stereo), $2,099
M2442: 24/4/6/2 (stereo), $2,499
RM224: 14/4/4/2, $TBA

Ramsa/Panasonic
WR-S4412: 12/4/4 aux plus ea. input/0, $2,295
WR-S4416: 16/4/4 aux plus ea. input/0, $2,695
WR-S4424: 24/4/4 aux plus ea. input/0, $3,495
WR-C4512: 12/4 bus plus 8 matrix/4 aux plus ea. input/0, $3,195
WR-C4520: 20/4 bus plus 8 matrix/4 aux plus ea. input/0, $3,995

Rane
FLM82: 4 stereo/2/2/0, $399
SM26B: 6/2/0/2, $399
SM82: 8 stereo/1 stereo/1 stereo/1 stereo, $599

Rolls Corp.
RM81: 8/1/1/1, $290
RM65: 6/2/2/1, $320

Ross Systems
RCS 1402: 14/2/2/2, $599
RCS 802: 8/2/3/2, $620
RCS 1202: 12/2/3/2, $820
RCS 1602: 16/2/3/2, $1,050
RCS 2402: 24/2/3/2, $1,300
RCS 2842: 28/4/8/8, $3,295

Samson Audio
Mixpad: 9/2/2/2, $249.99
MPL1502: 15/2/2/2, $399.99
MPL1640: 16/4/3/3, $749.99
MPL2242: 22/4/6/4, $1,099.99

Sony
MXP-210: 8/4 (2 line, 2 monitor)/2/2, $2,525
MXP-290: 8/2/2/2, $4,525

Soundcraft
K1: 8, 16, 24, 32/4/6/2 (stereo inputs option), $3,000-$7,600
K3: 16, 24, 32, 40, 48/8/8/4 (stereo inputs option), $13,000-$34,000
Delta DLX: 8, 16, 24, 32/4/4/2, $5,000-$12,500
Venue II: 16, 24, 32, 44/8/6/4, $10,800-$21,500

SoundTech
MetroMix M420: 4/5/3/1, $619.90
MetroMix M620: 6/5/3/1, $669.90
MetroMix M630: 6/5/3/1, $849.90
MetroMix M830: 8/5/3/1, $899.90
MetroMix M660SB (box), M660 (rack): 6/5/3/1, $1,159.90
MetroMix M860SB (box), M860 (rack): 8/5/3/1, $1,249.90
QuickMix QM6: 6/1/1/1, $399.90
4150: 4/3/1/1, $579.90
306D: 6/3/1/1, $899.90
TransMix ST122T: 12/5/3/2, $999.90
TransMix ST162T: 16/5/3/2, $1,229.90
TransMix PC1250T: 12/5/3/2, $1,999.90

Soundtracs
Topaz Mini: 12/2/2/2, $499 ►

Topaz Macro: 14/2/2/2, $679
Topaz Maxi: 24, 32/4/8/4, $2,999, $3,699
Topaz Project 8: 24, 32/8/6/4, $3,995, $4,995

Speck Electronics
Xtramix-CX: 40+/8/8/8, $4,215
Model SSM-24: 24/2/8/8, $4,930
Model SSM-56: 56/2/8/8, $9,310

Spirit by Soundcraft
Protracker: 8/0/1/1, $999.95
Powerstation: 8 mono, 2 stereo/0/2/1, $1,599.95
Live 4² (Mark 2): 12, 16, 24, 32, 40/4/6/4, $1,999.95-$7,299.95
Studio "8 Bus": 16, 24, 32/8/4 effects, 2 foldback/4, $2,999.95-$4,599.95

Studiomaster
Diamond Club 62RDC: 6/2/2/2, $399.95
Diamond Club 82RDC: 8/2/2/2, $529.95
Diamond Club 122RDC: 12/2/2/2, $649.95
Diamond Club 162DC: 16/2/2/2, $749.95
Diamond Pro 83RDP: 8/3/4/3, $759.95
Diamond Pro 123RDP/A: 12/3/4/3, $959.95
Diamond Pro 163DP: 16/3/4/3, $1,199.95
Diamond Pro 1643DP: 16/4/4/3, $1,695
Diamond Pro 2443DP: 24/4/4/3, $2,195
Star System: 18/2/4/9, $2,250
Mixdown Classic MD8C-16: 16/8/6/9, $2,495
Mixdown Classic MD8C-24: 24/8/6/9, $2,995
Mixdown Classic MD8C-32: 32/8/6/9, $3,595
P7-16: 16/8/6/4, $4,295
P7-24: 24/8/6/4, $5,945
P7-32: 32/8/6/4, $7,595
P7-40: 40/8/6/4, $9,245

TASCAM
M-108: 8/4/2/2, $889
M-1508: 8/4/3/4, $1,299
M-1016: 12/2/6/4, $1,499
M-1516: 16/4/3/4, $1,949
M-1024: 20/2/6/4, $2,199
M-2600MKII: 16, 24, 32/8/6/2, $2,999, $3,899, 4,699
M-3700: 24, 32/8/6/4, $14,999, $16,999

Yamaha
MM1402: 6 mono mic-line, 4 stereo line/1 stereo/2/2, $449
RM800-16 Analog Recording Console: 16/8/6/4, $1,699
RM800-24 Analog Recording Console: 24/8/6/4, $2,399
ProMix 01 Programmable Mixer: 18/2/4/2, $2,199
02R Digital Recording Console: 24/8/8/2, under $10,000
MX200 Series: up to 24/1 stereo/4/2, $1,099 for 24 inputs
MX400 Series: up to 24, plus 4 stereo inputs/4/5/4, $2,699 for 24 inputs
M2000 Series: up to 40, plus 2 stereo inputs/8/6/4, $17,999 for 40 channels

Yorkville Sound
50K: 2/0/1/mono unit, $369
100K: 3/0/1/mono unit, $579
300K: 5 plus aux. in (RCA)/2 stereo (line out, tape out), 1 mono amp in/2/2, $1,149

DAT RECORDERS

The land of DAT decks includes both portables suitable for field work and powerful rack units. What follows is a bare-bones listing of the currently available DAT models; we have noted battery operation, if it's supported, and digital I/O (AES/EBU, S/PDIF, or both). We also allowed each manufacturer to give us a (very) brief description of important features.

Fostex
D-5: three sampling frequencies, TOC functions, ID facilities, 1 bit converters, AES/EBU & S/PDIF, $1,475.
D-10: built-in 8MBit RAM, instant start & scrubbing, optional sync card for timecode reading and RS422, AES/EBU & S/PDIF, $2,895.

JVC
XD-21010 TN: coax & optical digital I/O, includes remote, K2 interface with 4th order noise shaper, $1,700.
XD-P1PRO: digital I/O, portable, SCMS-free, three-hour battery operation, micro remote included, selectable between 32, 44.1, and 48kHz record and playback modes, $1,750.

Otari
DTR-8: switchable between +4dBu and -10dBV, 32, 44.1 & 48kHz, 300x play speed search, AES/EBU & S/PDIF, $2,000.
DTR-90T: built-in synchronize and timecode reader/generation, all channels (including timecode) independently recordable, AES/EBU & S/PDIF, $10,393.

Panasonic
SV3700: shuttle wheel, remote included, high performance A to D converters, digital I/O, $1,695.
SV4100: instant start, external sync capability, remote included, enhanced digital interface, digital I/O, $2,795.

Sony
TCD-D8: portable, battery operation, digital I/O, $799.
DTC-A7: studio recorder, digital I/O, $1,099.
DTC-A8: four-motor direct drive mechanism, super bit mapping in A/D circuitry, digital I/O, $1,395.
PCM-2600: rack-mounted, four-motor direct drive mechanism, super bit mapping in A/D circuitry, read after write monitoring, AES/EBU, $1,795.
PCM-2800: rackmounted, four-motor direct drive mechanism, super bit mapping in A/D circuitry, read after write monitoring, AES/EBU, $TBA.
TCD-D10 Pro 2: portable pro DAT, battery operation, four D.D. motor mechanism, AES/EBU, $4,000.

TASCAM
DA-20: entry-level DAT recorder, defeatable SCMS, user-bit accessible, S/PDIF, $1,099.
DA-30 Mk. II: shuttle dial, selectable copy ID, S/PDIF & AES/EBU, $1,599.
DA-P1: portable, SCMS-free, balanced inputs, built-in limiter, battery operation, S/PDIF, $1,899.
DA-60: synchronizable, four heads, preview feature for instant record start, AES/EBU, $6,299.

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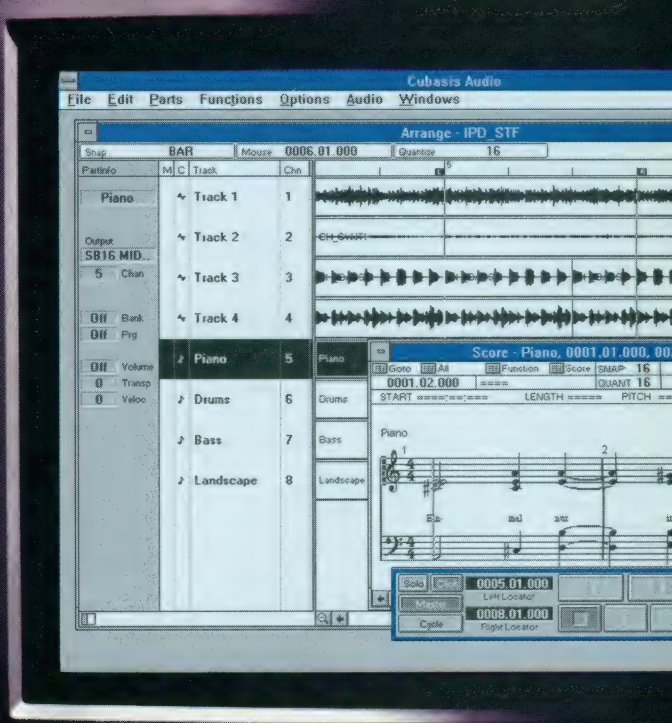
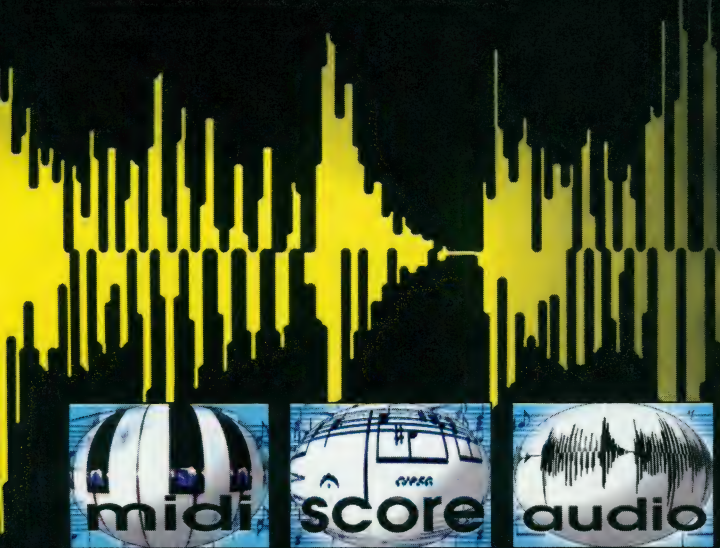


The Revolution in Home Recording!

With any Windows MME Sound Card, Play your guitar and sing directly into your PC computer! Record, Edit and Playback 8* Tracks of Digital Audio. Plus you have 64 tracks of MIDI recording with Score Editing and Printing.



*Hardware utility included to determine number of tracks obtainable

Tested Sound Cards

- Digital Audio Labs Card D*
- Ensoniq Soundscape S2000*
- MediaVision ProAudio Spectrum 16
- Orchid Sound Wave 32
- Peavey Media Morph*
- Roland RAP-10*
- Sound Blaster 16, 16 plus & AWE
- Steinberg X-DMC
- Turtle Beach Tahiti*, MultiSound*, Monterey *

* *Record during Playback*

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GENERAL MIDI

PC

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Your boss doesn't listen to you.
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We hear you. *Introducing the new standard in synthesizer modules: the Roland JV-1080. The module which has the features you've been asking for and some you haven't even imagined yet.* For starters, it has 64-note polyphony, is 16-part multitimbral and comes with 512 of Roland's newest and hottest patches. It's also ultimately expandable, taking up to four SR-JV80 Series 8 Mbyte expansion boards simultaneously. An additional SO-PCM Series wave card can be added which gives you a whopping 42 Mbytes of internal ROM. That's over 1500 Roland patches at your fingertips. It's more performance power than was possible ever before.

With the optional M-512E Memory Card, you can store an additional 128 user patches.

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If that weren't enough, we made it easy to use and gave it a General MIDI mode so it's compatible with the world of Standard MIDI Files (SMF). You asked for extensive synth editing parameters. We heard you. So the JV-1080 has 10 advanced tone structures and even LFOs that sync to MIDI clock.

But perhaps best of all, the JV-1080 has a surprisingly affordable price. Which should be music to your ears.

Haven't you waited long enough? Visit your nearest Roland dealer today and ask to hear what you've been asking for all along: the JV-1080. Or call (800) 386-7575 and select 3 to receive an exciting, full-color brochure. Think of the JV-1080 as our way of letting you know we hear you. Loud and clear.

Roland

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INDIVIDUAL DISKS

ANY 10 DISKS JUST $99.90!

SYNTHS

Super Dance	920
Super Synth	922
Super Pop	924
Super Jupiter	930
Pop/Dance	932
Ultimate Pop	934
Analog Synths	936

PIANOS & MORE

$18 EACH

Piano 1	941
Piano 2	941
Piano Mix 1	940
Piano Mix 2	940
B3 Organs	942
Acoustic Strings	946
Synth Vox & Choir	944
EPs 945	Guitars 947

DRUMS

Electronic Dance 1	901
Electronic Dance 2	901
Electronic Dance 3	901
808 Dance	902
909 Dance	902
Super Rap Kit 1	903
Super Rap Kit 2	903
90's House Kit 1	904
90's House Kit 2	904
90's House Kit 3	904

SYNTH COLLECTIONS

Our sounds for the best synths are here in multi-disk sets for your sampler! Each title contains 8 HD disks for K2000 & Peavey SP, 7HD disks for AKAI, ASR-10, TS-10&12, & Esi-32, & 14 disks for the EPS/EPS16+, filled with over 11 megs of super synth hits, leads, pads, basses, & more from the best synths per set! Classic patches from each synth, from our top rated sounds!

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Analog Pro™ 1	681
Analog Pro™ 2	682
Analog Pro™ 3	683
JD-990 Collection	684
Pads 1 685	Pads 2 686
Filmscape 3-D™	687
SY85 Collection 1	667
SY85 Collection 2	668
D-70 Collection 1	672
D-70 Collection 2	673
D-50 Collection 1	670
D-50 Collection 2	671
01/W Collection 1	660
01/W Collection 2	661
M1 Collection 1	664
M1 Collection 2	665

& MORE... CALL!

SAMPLE CDs

CD BLOWOUT!!!! $59 EACH, $99 FOR 2!!!!

TECHNOLOGIC™

112 incredible all-new techno analog AudioSequences, 21 techno drum loops, 180 dance synths & basses, 3 great 909 techno drum kits and 23 techno drums! All you need for an incredible techno collection!

JUST $29 THIS MONTH

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Incredible natural, acoustic drums of many types... big, fat snares, huge bass drums, powerful cymbals, concert hall drums, orchestral percussion instruments & more!

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The absolutely classic original Fairlight IIx library is now available on audio sampling CD! Officially endorsed by Fairlight of Australia. A definite must-buy!

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Over 650 digital samples of 24 classic analog synths, including ARP Odyssey, Chroma, Polaris, Elka Synthex, EML 101, Korg MS20, Memory Moog, MiniMoog, OB Matrix 12, OB-1, SEM, Xpander, Juno, Jupiter 8, MC202, TB303, Prophets+!

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01/W J3 X-3 03R X-5 05R

Super Dance	11
Colorbrush	12
01 Dance	13
Heaven Synth	14
Urban Sound	15
Filmscape	16
01 Natural	17

Disk:44.90 ROM:79.90

SPECIAL: ALL 7 DISKS FOR $199!

ROLAND JV-80 JV-1080 JV-1000 XP-50

Super Dance	81
Power Keys	82
Ultra Natural	83
Supersynth	84
Filmtexture	85
Super Pop*	86
New Age	87
Vintage Collection*	88

Disk:44.90 ROM:69.90

JV-1000 & XP-50 Disks:44.90

KORG M1

Super Dance	51
Super M Synth	52
Filmtexture	53
M1 Natural	54

ROM:69.90 Disk:44.90

WAVESTATION

Super WaveDance	41
UltraTexture	42
SoundBrush	43
Power WaveSynth	44
Filmscape	45
EX Super Pop/Dance	46
EX Pop Collection	47
AD Pop/Dance	48
AD Filmtexture	49

ROM:69.90 Disk:44.90

ALL WORK WITH EX, AD & SR! TOP RATED!

SPECIAL: ALL 9 ON DISK FOR $249!

JD-800 & JD-990

Ultradance	801
Wondersynth	802
Supersound	803
Wonder Mix	804
Super Jupiter	805
Filmscape	806

ROM:69.90 Disk:44.90

CALL FOR SY99, DPM3, SC-55 & TG100!

SY85 TG500

PROGRAM DISKS

Dance	851
Supersynth	852
Filmscape	853

Disk:39.90

256 Voices & 128 Performances Ea!

5*-STAR REVIEW! SEE LEFT

K2000 K2500

PROGRAM DISKS

Pop/Dance	201
Super K Synth	202
SynthTexture	203
Superscape	204

Disk:29.90

SYNTH COLLECTIONS

8HD DISK SETS!

69.90 See top left!

CD-ROMS SEE LEFT!

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ANY 10 SAMPLED SYS, JUST $99.90!

SY85 sample disks have 512k of all-new samples + up to 64 voices & 64 combis each, K2000 sample disks have 1.4 megs of samples + up to 100 patches each. And all sample disks are now just $18 each! Also see the K2000 8-HD synth collections for 69.90 each!

SYNTHS	PIANOS+
Super Dance	Piano 1
Super Synth	Piano 2
Super Pop	Piano Mix 1
Super Jupiter	Piano Mix 2
Pop/Dance	B3 Organs
Ultimate Pop	Acoustic Strings
Analog Synths	Synth Vox & Choir
	EPs Guitars

DRUMS	
Electronic Dnc 1	Spr Rap Kit 1
Electronic Dnc 2	Spr Rap Kit 2
Electronic Dnc 3	House Kit 1
808 Dance	House Kit 2
909 Dance	House Kit 3

ROLAND D-50

Dance	511

ROM:69.90 Disk:44.90

MORE:...

DISK: 39.90 ROM: 69.90

T-SERIES & M1EX	SY77
Super Pop/Dance	Wonder Dance
Power Natural	Ultrasound
Superscape	Power Synth
	77 Heaven

BASED ON OUR TOP RATED HI SOUNDS! SEE T-SERIES EX SAMPLE DISKS ABOVE!

VINTAGE & CLASSIC KEYS	D-70
Analog Dance	Power Dance
Filmscape	Natural
	Supersynth
	Soundscape

CD-ROMs

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ULTIMATE CD™

[FORMATS: K2000, SampleCell Max, AKAI, & ASR-10!]

The best modern synths, all in one! Tons of samples from our sounds for SY85, D-70, D-50, 01/W, M1, WS, JV-80, VINTAGE KEYS & more, on CD-ROM for your sampler! Over 1100 patches, K2000 vsn has over 2600! The best synth library available... our entire original library!

Keyboard's top comments: "Pro-Rec's Ultimate CD has a wealth of wonderful samples taken from synths, from Pro-Rec's existing patch library... The basses are big and solid... the synths, the drums... are terrific. Many of these sounds fit right into a pop arrangement. There's enough material here to keep a synthaholic celebrating for weeks!"

MEGA-SYNTH™

[FORMATS: K2000, SampleCell Max & PC, MAUI & AWE32!]

The *best* analog synth hits & leads, tons of fat, punchy basses, rich lush pads, huge 3-D ambient film sounds & much more... perfect for R&B, dance, techno & more! ...And just $149! Over 300 patches, K2000 version has over 750! A complete synth, all on one super CD-ROM!

KEYBOARD's top comments: MEGA-SYNTH™ "Offers some great samples... fat and punchy. ...Predominantly filled with analog-type synth samples, covers a broad palette of leads, pads & basses. ...The drum kits have a distinctly dance orientation, ...a good combination for doing dance mixes. ...Most of the pads & synth strings sound very good, even when used for dense voicings. Some of the brighter patches could easily cut through an orchestra of chain saws! Mega-Synth™ offers a wide variety of analog-style sounds, ranging from serviceable to great!

★BOTH AKAI/K2000 CD-ROMs BELOW OR ONE SUPER E-III/Esi-32 CD-ROM - JUST $169!★

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220 megs of classic analogs, FAIRLIGHT, Arp, Moog, Matrix 12, SY77, WS, MicroWave, JD-800 & MORE samples & patches for AKAI! Works perfectly with K2000!

STATE OF THE ART NATURAL

NOW $99

220 megs of rich, beautiful pianos, rhodes, hammonds, strings, horns, drums, guitars & more! Rich, amazing acoustic sounds, for AKAI & K2000!

TOP REVIEWS!

A 5 STAR REVIEW OF OUR SY85 SOUNDS FROM KEYBOARD!:

"There's plenty to like on Pro-Rec's **Supersynth & Filmscape** disks for the SY85, but their **Dance** collection takes top honors! ...The focus stays tight on Euro/Techno and other electronic dance patches. **Dance** delivers what it promises, a comprehensive & frequently exciting arsenal of techno timbres. If dance grooves are your game, you won't need any other synthesizer sound source than this." BANG FOR THE BUCK: 5 STARS!

OUR 01/W, 05R, X-3 & J-3 SOUNDS ARE TOP RATED BY KORG CONNECTION!:

SUPER DANCE: "Excellent - Couldn't be much better! ...Add this one to my personal collection. Super Dance tastefully combines the older analog sounds with a modern digital finesse... mixing old analogs with modern digital synths... this collection certainly won't disappoint!"

FILMSCAPE: "This set of sounds by Pro-Rec is truly outstanding. Over all, this set of sounds is among the best I've ever heard! 5 out of 5 rating. A must buy!" - the only card ever given this rating!

01 NATURAL: "This disk of sounds by Pro-Rec is fun for the whole family... the quality of programs is great & they can be applied to just about any style and genre of music. Excellent - Couldn't be much better!"

"The bottom line is these guys make great sounds. Many of Pro-Rec's sounds made it into my personal sound library, and they're gonna stay there." What more can they say?

OUR M1 SOUNDS WERE TOP RATED IN KEYBOARD!

M1 SUPER DANCE: "We love this card!... filled with edgy, grating, annoying and wonderfully inventive patches - just the thing for dance/industrial rave/techno/house fanatics... Plenty of hot basses, fat pads, and percussive, description-defying whatsits to satisfy the most discriminating key pounder!"

M1 SUPER M SYNTH: "Cutting, static-filled synth textures. A treasure trove of choppy punchy sounds for the techno-minded. Not a 'standard' collection by any stretch. Lots of fat, fuzzy bass & lead sounds... &crunchy analog synth standouts to attract dance-music artists!"

M1 NATURAL: Plenty of warm, beautiful sounds, suitable for atmospheric effects and new age tracks."

OUR WAVESTATION SOUNDS ARE TOP RATED BY KORG CONNECTION!:

Classic analog sounds mixed with today's bright digital stuff!... EX Pop Collection & AD Pop/Dance rank somewhere between 4 and 5 stars! (5 is perfect). If you're doing pop music, AD Pop/Dance collection belongs in your Wavestation! There are definitely some sounds in each bank that make it into my permanent collection. Pro-Rec continues to produce consistently excellent sound programming!

MORE TOP COMPLIMENTS FROM KORG CONNECTION!:

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BUYER'S GUIDE

MIDI CONTROLLERS, PROCESSORS, RETROFITS, & STANDS/CASES/BAGS

BY **RANDY ALBERTS & DEBBIE GREENBERG**

Sometimes it seems nothing is beyond the reach of MIDI. In this grab-bag section of the Buyer's Guide, we present comprehensive listings of MIDI controllers (both master keyboards and alternate controllers), data processors from mergers to whatever, and retrofits for older analog synthesizers. To round out the proceedings, you'll find a variety of keyboard stands and cases suitable for both road and studio. (For your reference, KR stands for Keyboard Report.)

MIDI CONTROLLERS

Wanna make noise with MIDI? Here's a list of MIDI controllers, including master keyboards, strap-on keyboards, MIDI wind controllers, and alternate controllers. (Drum- and percussion-related MIDI devices are covered in the Plug-In Percussion section on page 103.) We had only enough space to provide you with a brief description and retail price of each controller; for more information, use the address list on page 162 to contact the manufacturers.

Akai

EWI 3020/EWI 3020M: wind controller (EWI 3020) that lets you play naturally and with emotions, and an analog synthesizer module (EWI 3020M) featuring warm, expressive sounds, $1,399.95. KR: EWI1000, EWV2000, Mar. '89.

EWI 3030M: digital synthesizer module providing high-quality, realistic sounds from PCM modules, $1,785.

BCK/Forefront

FT-3 Patch Commander: program change transmitter and multi-function MIDI utility control module, $129.95. KR: Apr. '94.

DF-1 PC Plus Footswitch: footswitch controller for the FT-3 Patch Commander, $49.95.

Buchla & Associates

Thunder: multi-dimensional tactile MIDI controller, sensitive to pressure, location, and gesture; user-programmable MIDI interface; memory cards for storing user presets, $1,990. KR: July '90.

Lightning II: spatial MIDI controller, sensitive to location and gesture; wireless, handheld, infrared wands; user-programmable MIDI interface; memory cards for storing user presets; available with self-contained synthesizer, $1,995.

EMS

Soundbeam: ultrasonic distance-to-MIDI converter, maximum range variable from 11" to 20'; beam divergence: 16 degrees; MIDI parameters: note on/off, modulation depth, pitch-bend, $2,250.

Fatar

MP-1 MIDI Pedal Controller: 13-note pedalboard, eight-octave shift, programmable MIDI channel, and program change, $450.

CMS-61 Computer Music Workstation: 61-note synth-action keyboard with ergonomic design that allows it to fit in your existing computer rig; great for real-time note entry, $479.95.

Studio 49: 49-note, synth-action, velocity-sensitive, transmits on channel 1, $199.95.

Studio 490 Plus: 49-note, synth-action, program and bank change, sustain and volume pedal inputs, $279.95.

Studio 610: 61-note synth-action keyboard, program and bank change, aftertouch, pitch and programmable control wheels, sustain and volume pedal inputs, $379.95.

Studio 610 Plus: 61-note weighted synth-action keyboard, program and bank change, aftertouch, pitch and programmable control wheels, sustain and volume inputs, $499.95.

Studio-90/C: hammer-action 88-note keyboard controller, transpose, one split, $995.

Studio-900 (Road Case) and Studio-900/C (Cabinet): hammer-action 88-note keyboard controller, program change, bank change, pitch and programmable control wheels, sustain and volume inputs, Studio-900: $1,395; Studio-900/C: $1,295.

Studio-1176/C (Cabinet): hammer-action 76-note keyboard controller, four zones, aftertouch, pitch and mod wheels, program and bank change, programmable and master volume sliders, LED display, programmable CV and sustain pedal inputs, $1,680.

Studio-1100 (Road Case) and Studio-1100/C (Cabinet): hammer-action 88-note keyboard controller, four zones, aftertouch, pitch and mod wheels, program and bank change, programmable and master volume sliders, LED display, programmable CV and sustain pedal inputs, Studio-1100: $1,895; Studio-1100/C: $1,680.

Studio-2001 Ver. 2.1 (Road Case) and Studio-2001/C Ver. 2.1 (Cabinet): hammer-action 88-note keyboard controller, eight zones, 4 x 4 MIDI mapper, aftertouch, LCD display, two programmable control wheels, four programmable sliders, two programmable CV inputs, Studio-2001 Ver. 2.1: $2,295; Studio-2001/C Ver. 2.1: $2,095, with gloss black or gloss white finish: $2,295. KR: Apr. '93.

Interactive Light

Dimension Beam: a beam of high-resolution infrared light that translates motion into an electronic expression signal; use your hand, body, guitar neck, etc. to control pitch-bend, volume, samples, synthesizers, lights, $600.

JLCooper Electronics

CS-1 Control Station: input device for hard disk-based recording systems and MIDI sequencers; conventional controls look and feel like a tape recorder transport; optically-encoded jog/shuttle wheel provides precise positioning and effortless "scrub" editing, $499.95. KR: June '91.

CS-10² Professional Control Station: control surface for Pro Tools, Spectral, Sonic Solutions, SADiE, and other digital audio/video workstations; provides access to transport, automation, and digital signal processing functions; controls look and feel like a tape recorder transport; jog/shuttle wheel offers precise positioning and effortless "scrub" editing, eight smooth tracking 100mm long throw faders, control automation functions, and six rotary provide DSP access, $799.95.

FaderMaster: 1 in x 1 out MIDI command controller for mixing MIDI volume and stereo panning on sequenced tracks using eight faders simultaneously; eliminates using mouse to mix volume of sequenced tracks; design permits seamless re-recording of continuous data, $299.95. KR: Apr. '91.

FaderMaster Professional: 1 in x 1 out MIDI automation controller for MIDI-based automation or digital audio recording; universal MIDI controller that can control, mix, and edit with MIDI sequencers, samplers, and signal processors, $549.95.

MCS Media Control Station: comes equipped with presets for Adobe Premiere, Sound Tools, Vision, Performer, and other Macintosh software; can create memory presets for any Mac application with included software; large transport buttons; jog/shuttle wheel can scroll through QuickTime video frames and audio or MIDI files, $299.95.

Kawai America Corp.

MDK-61 II (MIDIKey II): 61-note, velocity-sensing, pitch and mod wheels, ten velocity curves; mod wheel assignable to any cc#, strap buttons, $549.

Midivox

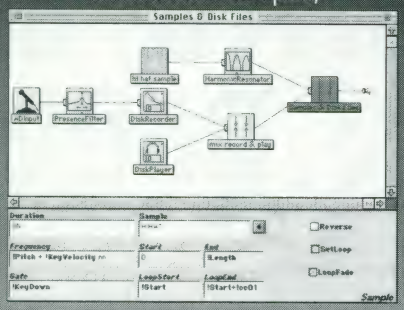
Midivox: real-time voice-to-MIDI converter that uses

KYMA™
Sound Design Workstation

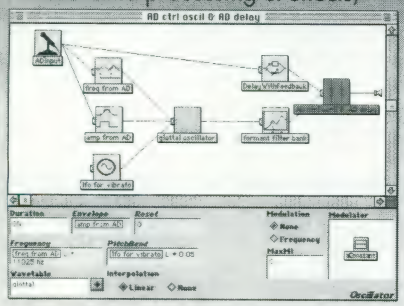
...an intelligent, interesting computer that shapes sounds, routes, synthesizes, and morphs... It's cool!
— Frank Serafine, sound designer

Kyma (key-mah) combines:

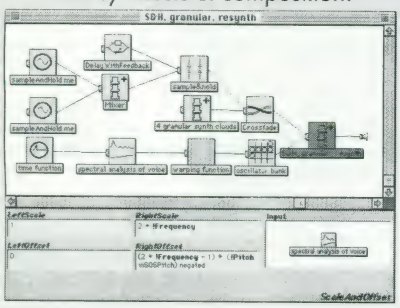
disk tracks & samples,



real time processing & effects,



with synthesis & composition.



Design sounds graphically on your Macintosh or Windows personal computer.
Generate and **process** the sound in real time on Kyma's multi-DSP mainframe.
Assemble the sounds entirely in Kyma or use your favorite audio sequencer or multitrack editor.
Perform your sounds in real time using MIDI controllers.

A few minutes with a Kyma system, and you'll be certain that the future has arrived.
— Dennis Miller, Electronic Musician

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CIRCLE READER SERVICE # 158

MIDI CONTROLLERS, PROCESSORS, RETROFITS, & STANDS/CASES/BAGS

bio-sensor neck band and rackmount brain; microtonal and chromatic tracking; tracks humming, singing, scat singing, and talking, $1,595. KR: May '92.

Novation
MM10X Keyboard Controller: two-octave, 25-note MIDI keyboard controller; Yamaha QY10- and QY20-compatible, AC/DC, velocity-sensitive, eight-octave transpose, LCD display, pitch and assignable control wheel, $239.95.

Oberheim
Cyclone: tap-tempo and MIDI-clockable programmable arpeggiator with interactive real-time control, $249. KR: May '89.
Strummer: intelligent MIDI box revoices chords played on keyboard to guitar chord structure, including strum speed, strum direction, etc., $249. KR: July '91.

Peavey
PC 1600: general purpose MIDI controller with 16 sliders, 16 buttons, data wheel, two CV pedal inputs, 50 presets, and 100 scenes; transmits any system- common or sys-ex message, $349.99. KR: Sept. '93.
C8p: 88-key MIDI controller keyboard with two MIDI ins and four MIDI outs, 240 x 64 graphic display, 64 presets, eight zones per preset, and programmable velocity curves, $1,599.99.
C8: same as C8p, but with disk drive, $1,999.99. KR: Sept. '92.
Cyberbass: bass guitar MIDI controller with wired-fret technology, fast and accurate tracking, 32 performance presets, high-quality electric bass, $1,799.99.

Penny & Giles
MM-16 MIDIWorkstation Controller: MIDI management systems and DAW controller with 16 endless-belt controllers, 64 program memories arranged in eight banks of eight for rapid access; can operate as a stand-alone generator of MIDI codes or in update mode, providing automation when linked to sequences and similar external equipment, $2,500.

RiCharde & Company
Charlie Lab Digitar: intuitive controller for creating strummed guitar parts; user sends MIDI note information to the Digitar from a MIDI keyboard or sequencer, then strums the Digitar's "strings"; the Digitar outputs note information according to the strumming, complete with performance dynamics, $449. KR: May '95.

Riday Systems
T-91 MIDI Controller: patented, unified keyboard allows for identical fingering in all 12 key signatures; "strap-on" unit, $1,395.

Rolls Corporation
RFX 93 Patchwork: MIDI switching control, provides MIDI control over four stereo effects loops, four latching switch functions, and A/B functions; front-panel control as well as MIDI; 128 presets, $199.99.

Softwind Instruments
The Synthophone: MIDI wind controller built into an alto sax body; has extensive harmonizing capability (up to five-part multitimbral); sends all common continuous MIDI controllers in scalable amounts; upgrade via EPROM exchange; stores 32 master patches, $3,850. (see Alternate Controllers column, Jan. '90.)

Stick Enterprises
The Grid: a version of The Stick, a two-handed tapping fretboard with customized Roland guitar MIDI interface, 10-string model: $2,300; 12-string model: $2,600.

Vicknair
Midimonica: five-octave pitch-to-MIDI converter with dynamic or fixed velocity; has built-in mic, diatonic and chromatic scales, two speed selections, four MIDI channels, selectable long- and short-note release, and selectable down transpose, $239.

Waldorf TSI GmbH
MicroWave and Oberheim Matrix-1000 Programmers: real-time editing while sequencer is running; spontaneous, intuitive programming; clear, logical design; edits may be recorded; easy adaptation of sounds, $590.

WaveAccess
WaveRider Jr.: converts brain, heart, muscle, and skin signals into MIDI output; three channels of biological input; Windows software; all accessories included, $750.
WaveRider Pro: same as WaveRider Jr., but with five channels, $1,500.
WaveRider Max Pro: uses Opcode's Max environment to convert brain, heart, and muscle input to MIDI, $1,800.

Yamaha
CBX-K1 MIDI Keyboard: extensive control of all XG-format parameters, 37 velocity-sensitive mini keys, compact for desktop use, MIDI merge function, $199.95.
WX11/BT7: MIDI wind controller, $505.
WX11 Set: MIDI wind controller with WT11 tone generator, $995.

Zeta Music
RetroPaks: Violin, Viola, and Cello: allows an acoustic instrument to control synthesizers with the addition of the Zeta RetroPak bridge; Zeta MIDI System is required to interface with a synthesizer. Violin: $1,095; Viola: $1,195; Cello: $1,495.
Jazz MIDI Violin, Viola, and Cello: Violin and Viola available in four- and five-string configurations; Zeta MIDI System is required to interface with a synthesizer; can include wireless components for analog audio out, Violin: $2,595; Viola: $4,495; Cello: $6,595.
Zeta MIDI System: enables Zeta MIDI instruments or Zeta RetroPaks to interface with MIDI synthesizers; tracks a string player's dynamics, pitch, and vibrato on each string; includes single rackspace MIDI brain, five-position footswitch, and all cables, $2,295.
Mark O'Connor Signature Series Violin: MIDI-compatible, limited-edition electric/MIDI violin, four- or five-string; can include wireless components for analog audio out, $3,495.

MIDI PROCESSORS/PATCHBAYS

Even when we eliminate (for reasons noted elsewhere) the MIDI patchbays and similar items that need to be hooked up to a computer to operate, there's still quite a variety to choose from.

Anatek/Creation Technologies, Inc.
Pocket Thru: MIDI thru box, no batteries or AC power required, stackable for multiple outs, handles all MIDI data, $49.
Pocket Merge: 2 in/1 out MIDI merge box, no batteries or AC power required, stackable for three or more inputs, handles large data volume, $89. KR: Aug. '89.
Pocket Sync: 1 in/1 out synchronizer, translates MIDI clock into FSK tone, FSK tone to MIDI clock; smart FSK allows starting anywhere in song, $99. KR: Feb. '92.
Wind Machine: 1 in/1 out breath controller interface, converts Yamaha BC-2 output into MIDI data, $119. KR: Jan. '93.
MIDImatch System: 1 in/1 out per box, long distance MIDI transmission booster, two-box system for running MIDI signals up to 4,000 feet, bi-directional, $159.
Studio Merge: 8 in/1 out MIDI merge box, each input has its own MIDI thru, merges up to 128 MIDI channels, handles large volumes of MIDI data, $399.

Aquila
MT2 MIDI Transmitter: optional add-on to either MR-2 or MR-1 system for PianoDisc and MIDI Player Piano, $445.

MRX1 Wireless MIDI System: 1 in/1 out wireless MIDI receiver and transmitter, eight selectable frequencies (902-928MHz), 75-foot operating range, internal antenna, $799.
MR2 Wireless MIDI System: 1 in/1 out wireless MIDI receiver and transmitter, $1,399. KR: Sept. '94.

ART (Applied Research & Technology)
X-15 Ultrafoot: 1 in/1 out/1 thru full-function MIDI foot controller, two expression foot pedals and foot keypads, $295.

BCK/Forefront
FT-7 MIDI Switch: 1 in/2 out or configurable as 2 in/1 out MIDI switcher, no power required, $34.95.
FT-9 MIDI Thru Box: 1 in/3 thrus MIDI thru box, battery powered, $34.95.
FT-5 MIDI Thru Box: 1 in/8 outs or configurable as 4 in/4 out MIDI thru processor, AC adapter included, $69.95.
FT-8 MIDI Merge: 2 in/1 out MIDI merge processor, line powered, $149.95.

Digital Music Corp.
MX-28M MIDI Patchbay/Merger Plus: 2 in/8 out MIDI patchbay, merger, transpose, zone mapper; data/power LED indicators, three-position switch for each output, All Notes Off panic button, $149.
MX-8 MIDI Patchbay/Processor: 6 in/8 out MIDI patchbay, patch-chain, delay, filtering, transposing, mapping, compander, channel shift, velocity cross switch; 32-character alphanumeric display, 50 nameable setups, internal power supply, one space rackmount, $329. KR: Apr. '88.

Epigraf
InfraMIDI Equator Studio Model II: 1 in/1 out, thru remote controller, provides remote control over CDs, VCRs, LaserDiscs, MiniDiscs, camcorders, DATs, and cassette decks via MIDI from any MIDI keyboard, $245.

JL Cooper Electronics
Nexus Plus: 2 in/8 out MIDI merger, three independent keyboard zones per MIDI channel, turns basic synth into a master controller, $199.95.
MSB Plus Rev 2: 8 in/8 out MIDI patchbay/processor, configures MIDI system quickly with large, easy-to-read LED display, $449.95. KR: Nov. '87.
Synapse: 16 in/20 out MIDI patchbay/processor, fully MIDI programmable, turns basic synth into master controller, extra large visual display, $1,195.

Kawai
MAV-8: 4 in/8 out MIDI patchbay, five-position fader selects between inputs, $140.

LaMarr Electronic
LaMarr Wireless MIDI Controller: 1 in/1 out/1 thru wireless MIDI program changer, attaches directly to guitar synth or any MIDI instrument to transmit up to 1,000 ft., $999.95.

Mark of the Unicorn, Inc.
FastLane: 1 in/3 out, thru MIDI interface, front-panel factory presets allow control over MIDI gear when used without a computer, $69.
MIDI Express: 4 in/6 out MIDI interface, front-panel factory presets allow stand-alone MIDI merging and splitting when used without a computer, $349.
MIDI Express PC Notebook: 4 in/6 out MIDI interface, front-panel factory presets allow stand-alone MIDI merging and splitting when used without a computer, $395.
MIDI Time Piece II: 8 in/8 out MIDI interface, front-panel factory presets allow stand-alone MIDI patching, merging, and muting when used without a computer, $595 (Mac), $695 (PC).

Midiman
Thru 1 X 4: 1 in/4 out MIDI thru box, self-powered but can also use external AC for added MIDI drive current, LED power indicator, $59.95.
Merge 2 X 2: 2 in/2 out MIDI merge box, self-powered but can also use external AC for added MIDI drive current, LED power indicator, $99.95. ►

CIRCLE READER SERVICE # 159

CIRCLE READER SERVICE # 160

What went through our minds when we designed the XP-50 Music Workstation?

Everything.

Hyperactive Reflexes

A **32-bit RISC** (Reduced Instruction Set Computer) chip gives the XP-50 lightning fast and accurate response to performance data.

Sensitivity Core

A **61-note velocity** and **aftertouch-sensitive keyboard** and newly-designed modulation lever help you add feeling to every performance. A large 40-character, 2 line backlit LCD makes visibility and data editing more efficient.

Right Brain Function

Loop, pattern and linear recording let you be creative without interrupting your thought and musical processes. **Pattern Paste** and the ability to create 100 customized patterns provide even more options.

Nerve Center

The newly designed **MRC-PRO sequencer** has 16 primary tracks which are each capable of controlling 16 MIDI channels. New Grid, Shuffle, and Groove quantize functions let you instantly adjust the feel in precise increments in realtime.

Aural Receptors

Ten tone structures allow access to two wave generators, multiple time variant filters and amplifiers, a ring modulator and booster. High-quality effects include eight reverbs, chorus and **40 insert effects** like two voice pitch shifter, rotary, time controlled delay and distortion/flanger.

Memory Center

The XP-50 nerve center is enhanced *with 640 preset* patches, 96 preset performances and 10 preset rhythm setups. When fully expanded, it can remember up to **1750 onboard patches**.

Linguistic Skills

The XP-50 has a **General MIDI mode** for playing commercial Standard MIDI File (SMF) song data. It also converts to the ways of other great minds like Super and original MRC formats.

Memory Overload

The XP-50 comes with a full 8 Mbytes of Wave ROM. It also accepts up to **four** 8 Mbyte SR-JV80 Series wave **expansion boards simultaneously** for a total of 40 Mbytes of sound.

Common Sense

The XP-50 will blow your mind. For anyone with a head full of ideas, it's the only workstation you should be thinking about. **Call (800) 386-7575** to order our *1995 New Products Video* ($9.95) featuring the XP-50 Music Workstation.

Vocal Capacity

64-voice polyphony and **16-part multitimbral** capability handle even the most demanding multi-instrument arrangements.

Instant Recall

Play songs from disk in **realtime** without the typical load and wait time of other workstations.

Pattern Recognition

Realtime Phrase Sequencing (RPS) allows patterns to be assigned to individual keys and **instantly triggered** for live performances, remixing, or spontaneous improvisation.

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CIRCLE READER SERVICE # 161

MIDI CONTROLLERS, PROCESSORS, RETROFITS, & STANDS/CASES/BAGS

MIDI Solutions, Inc.
Thru: 1 in/2 out MIDI thru box, active circuitry cleans up any skewing of MIDI data that has occurred at the input, MIDI-powered, includes MIDI indicator LED, $49.
Quadra Thru: 1 in/4 out MIDI thru box, active circuitry cleans up any skewing of MIDI data that has occurred at the input, MIDI-powered, includes MIDI indicator LED, $59.
Merger: 2 in/1 out MIDI merger, merges all types of MIDI data including sys-ex and MTC, MIDI-powered, includes MIDI indicator LED, $79.
Quadra Merge: 4 in/1 out MIDI merger, merges all types of MIDI data including sys-ex and MTC, MIDI-powered, includes MIDI indicator LED, $129.

Music Quest by Opcode
8 Port SE: 8 in/8 out MIDI interface (PC), front-panel factory presets allow control over MIDI merging, splitting, and routing when used without a computer, $499.95.

Peavey
MIDI Master II: 8 in/8 out MIDI patchbay/processor, MIDI patching, merge, channelize, split, layer, crossfade, filter, $349.99.

Rane Corporation
RPS 4: 0 in/1 out remote program switcher, converts contact closures to MIDI program changes, up to 16 program changes, four screw terminal inputs, $199.

Roland
MC-50 Mk.II Sequencer: 1 in/2 out/1 thru stand-alone hardware sequencer, eight tracks, 16 MIDI channels per track, 96 ppq, syncs to MIDI/Tape Sync II, 20-character x 2 line backlit LCD display, $950.

Rolls Music Corporation
RFX 93 Patchwork: MIDI switching control, provides MIDI control over four stereo effects loops, four latching switch functions, A/B functions, front-panel and MIDI control, 128 presets, $199.99.

Studiomaster, Inc.
MA-36 MIDI Analyzer: 1 in/1 thru MIDI line tester, provides constant analysis of MIDI line information via LEDs for send, receive, controller, and MIDI channel data, $99.

Tech 21, Inc.
MIDI Mouse: 1 out MIDI foot controller, compact, portable, battery-operable stomp box scrolls 128 program locations on the 16 selectable MIDI channels, $125.

MIDI RETROFITS

Got an old synth that you'd like to MIDI? Check out the following listings for companies who offer (either as kits or as modifications that they install) retrofits for older gear.

Angel City Audio
Turbo-DW for Korg DW-8000: adds bi-channel MIDI operation, local on/off, splits, layering, and memory expansion, $169.

Clarity
Retro: MIDI to CV converter, adds eight channels of MIDI to CV conversion for four polyphonic or multitimbral voices, or for eight continuous controllers, $595.
Retro 10: adds eight channels of 0-10 volt MIDI to CV conversion for lighting and VCA mixer control, $595.

Dr. Sound
MIDI retrofit kits installed on the following instruments:
ARP: Odyssey, 2600.
Korg: BX-3, CX-3, Poly-6, Poly-61, Mono/Poly.
Linn: LM-2.
Moog: Minimoog, Prodigy, Memorymoog, Micromoog, Source, Multimoog, Rogue.
Oberheim: OB-8, OB-X, OB-Xa, OB-1, DMX.
Rhodes: Chroma.
Roland: SH101, Jupiter-8, TR-808, Juno-60/6, VP-330, CR-78.
Sequential Circuits: Prophet-5 (rev 2.0, 3.0, 3.3), Pro-One.
Yamaha: PF10/15, CS-80.
All retrofit prices include installation for $499.95, except the Korg BX-3 and Yamaha CS-80, which are $550 (call for Linn LM-2 price); customer responsible for all shipping costs; installations add MIDI in, out, and thru.

Midimax
MIDIPROFessional Kits: $1,178 to $1,959 (installed). MIDI retrofit kits for accordions, button boxes, bandoneon, melodica; adds MIDI out; contactless retrofit systems use solid-state bellow pressure sensors and can be installed in any accordion or free reed instrument.

Wine Country Productions
MIDI retrofit installation kits for the following vintage synths and drum machines:
Korg: Poly-6/61 ($487), Mono/Poly, Trident Mk I/II ($459).
Moog: Memorymoog/Plus ($487), Minimoog, Prodigy, Source ($354).
Oberheim: OB-X, OB-Xa, OB-8 ($459), OB-1 ($354).
PPG: Wave 2.2 ($487).
Roland: Juno-6/60 ($459), Jupiter-8 ($487), Vocoder VP-330 ($349), TR-808 ($369), CR-78 ($379), SH-5, System-100/700, SH-101 ($365).
Sequential Circuits: Prophet-5 rev 2 & rev 3 ($459), rev 3.2 ($149), Pro-One ($354).
Simmons: SDS-5 ($389).
Yamaha: PF15/10, YP40 Clavinola ($244), CS-70M ($559), CS80 ($699).
All prices are for kits only, no installation included; all kits are internal and operate in omni mode and poly mode with 16 MIDI channel assignments and program select; most kits receive pitch and mod wheel data, sustain, velocity, aftertouch, and MIDI controller 4.
Pro Solo 1: single-channel MIDI-to-CV converter kit for any synth with CV & gate inputs; controls on any of 16 channels, responds to velocity, aftertouch, and MIDI controller 4, $277.
Pro-2: two-channel MIDI-to-CV converter kit for any synth with CV & gate inputs; controls on any of 16 channels, responds to velocity, aftertouch, and MIDI controller 4, $347.
Pro-4: four-channel MIDI-to-CV converter kit for any synth with CV & Gate inputs; controls on any of 16 channels, responds to velocity, aftertouch, and MIDI controller 4, $694.

STANDS, CASES, GIG BAGS, etc.

Okay, you've read enough of the Buyer's Guide to decide what gear you want to buy. But don't forget to budget for a few unglamorous essentials — you know, odds and ends like keyboard stands, cases, gig bags, covers, and studio furniture. Those are the items you'll find below. Of course, a list of this nature has to have limits, so we said "no can do" to items like racks, microphone stands, and music stands (unless they were part of a keyboard stand). Check the following list to find brief product descriptions and retail prices, alphabetized by manufacturer. (In some cases, we give a price range of least expensive to top-of-the-line.) A couple of well-known manufacturers failed to send us any info on their product lines, in spite of repeated requests.

BCK/Forefront
Anti-Static Keyboard Covers: nine models fit all major brands of keyboards; see-thru translucent vinyl to see keyboard status lights; protects against liquid, dust, dirt, and static electricity, $12.50–$24.50.

Calzone Case Co.
Universal LD-ATA Keyboard Case: 4114, 42" x 14" x 4.5"; will fit Casio VZ-1, CZ-1, FZ-1, Ensoniq ESQ-1, EPS, ASR-10, SQ-80, TS-10, Kawai K3,

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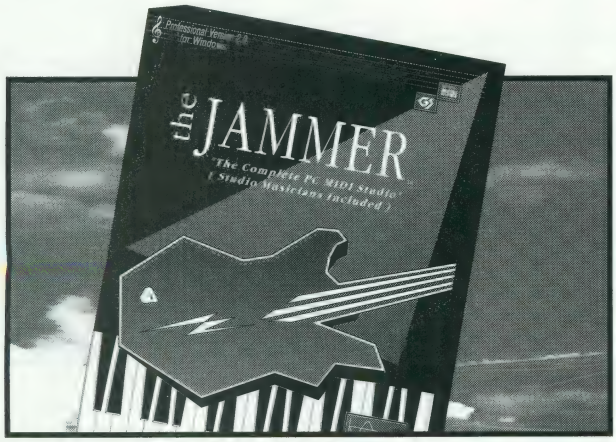
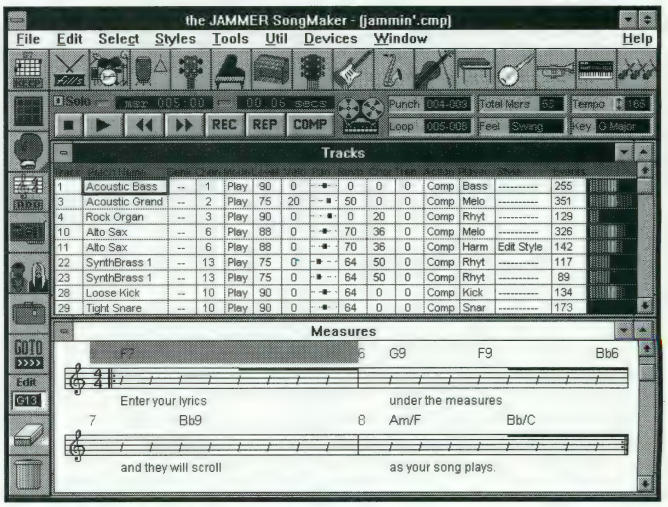
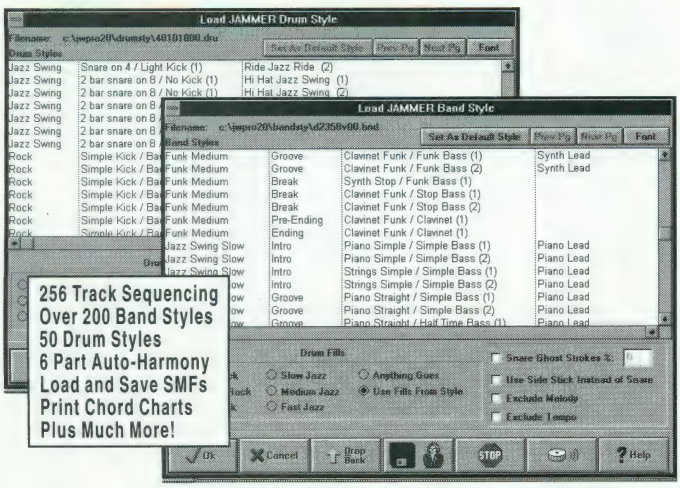


YOU'LL BE JAMMIN!

That's right! You'll be jammin' night and day, making music like never before. Of course you'll need to stop every now and then to eat and get some sleep. It's easy, just enter some chords on the lead sheet and then choose from over 200 band styles to create solid professional sounding songs. If you want that "real musician" feel and hip sounding styles, then the JAMMER is for you.

Not to be confused with programs that play back "canned" or pre-recorded licks, the JAMMER actually improvises and can create millions of original drum beats, drum fills, bass lines, rhythms, melodies, and harmonies all under your control. There's never been a better tool for writing, recording, practicing, and generating musical ideas. If you like creating music and want to get more done in less time, then you owe it to yourself to check out the JAMMER. You won't believe your ears.





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Here's over 60 hot new band styles for the JAMMER version 2.0. These styles are assorted intros, grooves, breaks, stops, holds, and endings for Jazz Swing, Ballads, Medium Rock, Slow Guitar Blues, Straight Country, Rhythm and Blues. Reggae, and HipHop.

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Here's over 100 hot new drum styles for the JAMMER version 2.0. These styles are assorted drum beats ranging from predictable to open ended jammin' styles for Jazz, Blues, Rock, and Country.

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Or call Soundtrek at 1-800-778-6859 and get a JAMMER DEMO disk for $5.00

Recorded Demo Line: 770-623-5887

K4, K5, Korg M1, 01/WFD, WS, X3, i3, Kurzweil K2000, Roland JV-35, JV-80, JV-50, D-50, E-20, W-30, $349.
Universal LD-ATA Keyboard Case: 5014, 49" x 14" x 4.5"; will fit Alesis Quadrasynth, E-mu Emax, Ensoniq KS-32, TS-12, Korg 01/W Pro, T2, Kurzweil K1000, Roland RD-200, JX-10, Yamaha CVP-3, CVP-5, $375.
Ensoniq KS-32 LD-ATA: 1/4" ply, black ABS, recessed hardware, $438.
Kurzweil PC-88 Case: 1/4" ply, black ABS, recessed hardware, $556.

Cellini Cases
Flight Cases: exact to your specs, $125 and up.

Hot Rod Road Cases
Keyboard Cases: built to spec, ATA all recessed, $120 and up.

Instandt America
GP-X Stand: entry-level "X"-style stand, five-position height adjustment, improved rubber padding, $43.
GP-Telescopic Stand: multi-functional (keyboards, amplifier, effects racks), 50% smaller than standard "X" models, $89.95.
GP-2 Stand: all-steel design, expandable, versatile, $159.95.
Computer Music Stand: all-in-one music workstation, converts to standard keyboard stand, $373.

Island Cases
Hybrid Series: medium-duty line for keyboards, amps, and mixers; custom sizes available, 61-note keyboard cases starting at $126; Mackie 24 x 4 case: $200.
Roadie Series: ATA cases in 1/2", 3/8", and 1/4" plywood for keyboards, amps, and mixers; specializes in custom cases, 61-note keyboard cases starting at $260; 24-channel mixer cases starting at $300.

Jan-Al Cases
KU176 Universal Keyboard Case: ATA 300 Cat 1 Case, fits most 76-key keyboards, optional lock and casters, $310.
KU188 Universal Keyboard Case: same as KU176 but for most 88-key keyboards, $344.
KUKTC Keyboard Tech Case: ATA 300 Cat 1 Case, two levels for tools, FX, and cables; optional lock and casters; ID 26" x 18" x 22", $489.
DAW Digital Audio Workstation: shockmount rack-style design; designated compartments for hard drives, keyboards, CPU, and monitors, $800.
DAW-HD: customized foam-lined rackmount shell for hard drives, CD-ROM, and I/O units, $120 and up.

Korg USA
SCX5 Case: soft case for Korg X5, $40.
SCK Case: soft case for Korg M1, T3, 01/W, 01/WFD, $130.

The Le Cover Co.
Regency Covers: tailor-fitted dust covers for synths and studio equipment; lightweight nylon material, waterproof, choice of colors, $9.95 and up.
LeGrande Covers: keyboard cordura nylon amp covers; padding and other options, urethane coated, waterproof; roadworthy, $19.95 and up.

MPM
Replacement Keyboard Pedals: sustain, volume, on/off, or piano-like sustain pedals, $18.00-$79.50.

The Music People
On Stage Stands Double X (KS9191) Stand: easy set up/tear down, easy storage, heavy/stable, $64.95.
Invisible Lightnin': 125 lb capacity, quick setup, 17 different heights (22"-36"), $79.
Invisible System One Stand: 250 lbs+capacity, very stable, two tiers, $156.

Mutec
Replacement AC Adapters: for all lines of keyboard and musical electronics, $12–$25.

Omnirax by Sausalito Craftworks
ProStation Jr. M/C: six-space riser bridge; one lower bay with six rack spaces and shelf; ergonomic design; heavy-duty casters, $559.95.
ProStation M/C: eight-space riser bridge for additional rack-mount modules, video monitor, and near-field monitors; two lower rack bays, one with 12 rack spaces and one with six spaces, sliding shelf for computer keyboard; ergonomic design; heavy-duty casters, $749.95.

Original
Hand-Crafted Piano Benches and Stools: finely crafted, all-wood piano benches and stools from Italy; many models, fully adjustable, large storage compartments, $159.95–$689.95.

Peavey Electronics
Black Keyboard X-Stand: quick-release knob for one-handed operation, durable black powder-coat finish, heavy rubber feet for stability and skid resistance, $49.99.
Leatherlike Keyboard Bags: heavy, durable leatherlike material, vapor flap under zipper with moisture barrier construction; small 43" x 15" x 6" and large 54" x 15" x 6", small: $85.99; large: $89.99.

Quik Lok
BS-619: universal amp/speaker cabinet/mixer/keyboard stand, weight capable to 180 pounds, $89.95.
QL-609: Quik adjust X stand, heavy-duty keyboard X stand with "hands-free" Quik adjust locking mechanism, $69.95.
QL-622: heavy-duty two-tier keyboard stand, fully adjustable upper tiers, single-braced, $109.95.
QL-623: double-braced, three-tier keyboard stand, fully adjustable; weight capable to 350 pounds, $199.95.
QL-642: two-tier keyboard stand, fully adjustable,

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double-braced; weight capable to 350 pounds, $159.95.
QL-645: keyboard stand, lightweight, single-tier X stand, $39.95.
QL-646: double-braced, single-tier keyboard stand, fully adjustable; weight capacity to 350 pounds, $89.95.
QL-647: keyboard stand, lightweight, single-braced keyboard stand, $54.95.
QL-689: two-tier column keyboard stand, 49.5" high, $149.95; 55.9" (QL-690): $159.95.
QL-695: transformer two-tier keyboard stand, height- and width-adjustable, $189.95; three-tier (QL-699): $219.95.
RS-959: keyboard/equipment stand, with angle adjustable eight-space rack stand, $179.95.
SL-100: one-tier slant keyboard stand, fully adjustable; sleek modern styling; full adjustability and portability, $129.95; two-tier (SL-200): $179.95.
X-200: single-tier X keyboard stand, lightweight, with cross-bar height adjustment instead of Quik Lok locking mechanism, $44.95.
WS-500: workstation, versatility for accommodating complex electronic musical equipment arrangements, $599.95.
WS-550: heavy-duty utility stand, for heavy mixing consoles and keyboards; fully height-, width-, and angle-adjustable; weight capable to 750 pounds, $139.95.
WS-560: build-on basic workstation unit, includes rear column and WS-550 base unit; shelves and tiers optional, $239.95.
Z-10: lightweight Z-style stand, for lightweight consumer keyboards, $39.95.
Z-715: fixed height Z-style stand, 27-1/2"; weight capable to 250 pounds, $89.95.
Z-716: adjustable height Z-style stand, $119.95.
Z-722: adjustable height, medium-duty Z-style stand, weight capable to 250 pounds, $149.95; longer width (Z-722L): $159.95.
Z-725: two-tier Z-style stand, Z-715 base with fully adjustable second tier, $169.95.
Z-726: fully adjustable, two-tier, Z-style stand, $219.95.
QL-677 table, multi-purpose, double X-braced utility table with solid metal top, $79.95.
Z-200BK: laser computer workstation furniture, straight module, dual-shelf, black frame, dove gray desk top; gray frame available (Z-200GY), $319.95.
Z-700LBK & Z-700RBK: laser computer workstation furniture, left and right angle modules; gray frames available (Z-700LGY, Z-700RGY), $349.95.
BX-10: economy keyboard bench, five height positions, $44.95.
BX-701: fixed position keyboard bench, $54.95.
BX-716: fully adjustable keyboard bench, has improved height adjustment mechanism, $79.95; with extra padded bench (BX-718): $99.95.
PB-100: piano style bench, heavy-duty steel frame, $79.95; with music compartment (PB-200): $109.95.
XB-207: bench/stand combo gift set, includes BX-10 bench and X-100 X stand, $99.95.

Rock N' Roller
Supercart Hand Trucks: available in three sizes and with RR-6AS small amp stand attachment; load capabilities to 500 pounds, $139.95–$199.95.

Rok Sak
Soft Keyboard and Utility Cases: large selection of off-the-shelf, custom-fit keyboard bags; wide selection of utility and rack cases, attaches, and anti-static, custom-fit keyboard covers, $11.95–$99.95.

Standtastic
Wall Mount Accessories: vertical frames, 36" tall, accommodates four keyboards, $52.95; Pro Tier Kit for keyboards deeper than 14", adjustable angle, $67.50; 30" x 12" and 48" x 24" solid shelves, $39.95 and $87.95.
Wall Mount Stands: saves floor space, flexibility in design, sturdy; accessory options: shelves, etc, $120.45 and up.
Pro Stands: lightweight aluminum with steel stress points, no bounce, 100 pounds per tier capability, adjustable height, width, and depth; accessory options: mic boom, rackmount kits, etc, 48" one-tier: $174.95; 48" two-tier: $224.95; 60" one-tier: $184.95; 60" two-tier: $234.95; three-tier: $284.95; four-tier: $334.95.

Star Case Mfg. Co.
Star Light: recessed hardware and surface-mount hardware versions; half the weight of ATA cases; ball corners; economical, $150 and up for recessed; $130 for surface-mount (depends on payload; custom-designed).
ATA Star (1/4" or 3/8"): full ATA compliance, heavy-duty construction, fiberglass finish, recessed hardware fittings, $175 and up (depends on payload; custom-designed).
Ultra Star: rigid 1/2" construction case, $200 and up (depends on keyboard or component packaged; custom-designed).

TNA Case Co.
Musicians Series Flight Cases: medium-duty surface-mounted hardware, 1/2" foam-lined; custom manufactured to any specifications, $75 and up.
Professional Series Flight Cases: heavy-duty surface-mounted hardware, 1" foam-lined, racks available; custom manufactured to any specifications, $125 and up.
Touring Series Flight Cases: recessed hardware, body thru-riveted as necessary, foam-lined as necessary, racks available; custom-manufactured to any specifications, $150 and up.

Tuki Covers & Bags
Prosoft Covers: custom protective covers for keyboards, mixers, racks, stands, amplifiers, and

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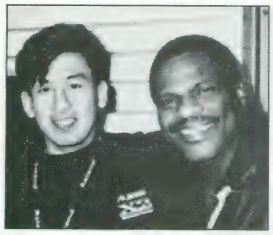
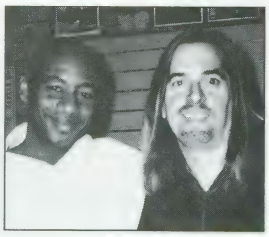


BILLY PRESTON
WITH LOUIS HERNANDEZ - PRO AUDIO



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Symphony: sit-down-height keyboard stand made of high-performance resin; for home, studio, or stage; headphone hooks, music holder, and disk tray; load capacity of 75 lbs, $99.

Deltex: two-tier column keyboard stand; easily removable tiers and legs; load capacity of 50 lbs per tier, 100 lbs total, $124.

Apex: two-tier column keyboard stand; tribars and legs fit inside stand to become its own carrying case; accessories can make three-tier stand; load capacity of 125 lbs per tier and 220 lbs total, $225.

Bench: portable, lightweight, sturdy; made of high performance resin, $45.

Studio 26 Organizer: modular-design workstation; large tabletop working surface; center tier and two half-tiers are angle- and tile-adjustable; work surface: 16" x 35-1/2"; adjustable height: 27-1/2" to 32"; load capacity of 150 lbs total distributed, $225.

Studio 36 Organizer: modular-design workstation; acrylic work surface: 16" x 18", a 42" tier, and one 15" half-tier; load capacity of 250 lbs total distributed, $270.

Viking Cases

Viking ATA Keyboard Cases: recessed heavy-duty hardware, lined with polyester, $100–$400.

Viking Norseman Keyboard Cases: non-recessed (surface-mounted), heavy-duty hardware, lined with polyester foam, prices are 10% less than ATA.

Viking Carrylike Keyboard Cases: 1/8" ABS semi-molded construction, surface-mounted hardware, lined with polyester foam, prices are 10% less than ATA.

Viking Crosstown Keyboard Cases: 1/2" furniture-grade plywood, ozite covering, recessed or surface-mounted hardware, prices are 40% less than ATA.

Yamaha Support Products

Rackmount Kit: attaches to Standtastic stands for additional security, single-space: $24.95; ten-space: $69.95.

Utility Shelves: for keyboards, computers, sheet music, etc.; lightweight; fits all manufacturers' stands, 36": $26.95; 48": $29.95.

KTB1 Keyboard Stand: fits most keyboards; black matte finish, tubular-steel construction, steel cross bracing, $39.95.

SBC1 Keyboard Bench: black matte finish, tubular-steel construction, padded seat, $44.95.

L2C Portable Keyboard Stand: works with most portable keyboards, $62.95.

Pro Tier: variable angle and depth control; 100 lbs capacity, no bounce, 14": $67.50; 18": $69.95.

KDC2850 Dust Cover: fits Yamaha PSR-420, 320, and similar size keyboards, $TBA.

KDC3744 Dust Cover: fits Yamaha PSR-620, 520, and similar size keyboards, $TBA.

Pro Series Keyboard Bags: Tuff Cote material, accessory pockets with zippered closures for pedal and cables, shoulder strap, and wrap-around handles, 41" x 19": $49.95; 45" x 20": $52.95; 48" x 24": $55.95; 48" x 21": $69.95; 56" x 23": $62.95.

Super Pro Series Keyboard Bags: Tuff Cote material, 2" foam padding, heavy-duty double zippers for use with padlock, twin strapping for added strength, leather handle, 42-1/2" length: $149.95; 50-3/4" length: $189.95.

MIDI Desk: fits Standtastic Pro stands; two shelves, security rails for stability, adjustable-height shelf, $331.50.

Yorkville Sound

IKS-X: single-tier X-style keyboard stand, $42.50.

KBS/1: single-tier X-style heavy-duty keyboard stand, $54.

PB-1: folding padded piano bench, $75. ■

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Christopher T. • Kokomo, IN

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Dean M. • Isamsville, MD

"Owned 2 prior, love them! Once you turn it on, you can't turn it off! It's a real "Blanket Lifter." P.S. Is this thing legal in all 50 States? " *Barry D. • Nashville, TN*

"The price is real low and Nathan East uses it." *Roydolph A. • Dearborn, MI*

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"It makes my 10 year old 4-track demos sound "Godlike"! I'm amazed at the magic this unit can do! Thanks for the product." *Ricky R. • Diamond Bar, CA*

"Need something to brighten up tracks in my home studio. Best investment per dollar yet. Should be standard equipment in any studio." *John S. • Lafayette, CA*

"After buying the 462–within two minutes of turning my rig on– I could never play without the 462 again." *Trevor D. • San Diego, CA*

"Vivian Campbell and Vito Bratta spoke of it." *Jared C. • Rices Landing, PA*

"An article about Joe Satriani. Good enough for him, good enough for me. This unit blows me away!" *Fred B. • Michesney Park, IL*

"Makes guitar amps scream!!" *Jeremy D. • Cupertino, CA*

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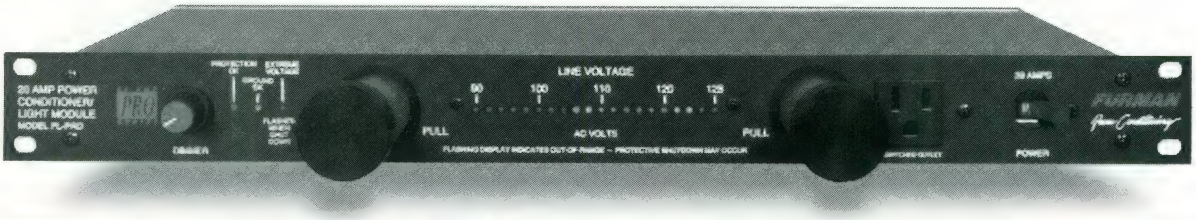

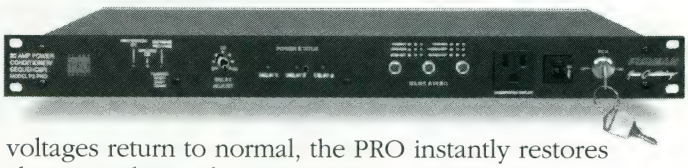

How does a new Furman PRO power conditioner keep your equipment out of the frying pan?

Simple. The PRO Series gives your equipment the industry's most comprehensive protection against damage from power problems. No other brand even comes close.

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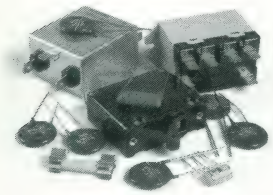
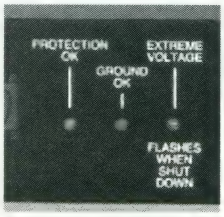


Only the PRO series uses all these protection components

Every Furman PRO utilizes a unique combination of MOV's, gas discharge tubes, fast-blow fuses, high voltage inductors and capacitors and high-inrush magnetic circuit breakers. That means a Furman PRO can safely absorb and dissipate a whopping 11,000 amperes of spike/surge current in any mode, even from a nearby lightning strike. And a Furman PRO is unmatched at preventing noise from fluorescent lights and other electronic pollution from leaking into your music.

Here's another Furman PRO Series exclusive you'll really like: Extreme Voltage Shutdown. Your PRO will not turn on if it senses abnormal mains voltages. If it's already on and detects that your voltage is too high or too low, the PRO shuts down power to its outlets, instantly. No damage to your equipment, no damage to your PRO. When the mains voltages return to normal, the PRO instantly restores clean, conditioned power to your equipment.



You always know your power and protection status before your equipment is switched on

There's a new Furman PRO for every need: The PL-PRO (top) features an AC voltmeter with flashing alerts for marginally high or low voltages, and new precision-machined, dimmer-controlled rack lights that automatically switch off when either light tube is pushed in. The PM-PRO (left) is for applications where lights aren't needed — it adds an RMS-reading AC ammeter along with the voltmeter. The PS-PRO (right) applies and removes power from its outlet groups in a variable timed sequence, and alerts you to wiring faults with neon indicators.

All Furman PRO models provide LEDs to indicate Protection OK, Ground OK and Extreme Voltage Shutdown, widely-spaced rear outlets for "wall warts," and a 10 foot long, heavy duty, 12 gauge cord.

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BUYER'S GUIDE

Sounds

CD-ROMs, SAMPLING CDs, & PATCHES

BY **RANDY ALBERTS**

In the five years since *Keyboard's* first Buyer's Guide, no product category has burst a seam more than sounds. We know it's not because creative keyboardists are less inclined to come up with their own sounds than they used to be. Maybe it's because you need the latest sounds to play in the latest styles, and a whole new breed of specialists has arisen that knows how to nail those sounds. Or maybe it's because samplers with capacious memories make it easier than ever before to slap a CD into the drive and get mixin'. For whatever reason, third-party sound developers have multiplied like tribbles.

In the following pages, sound developers and distributors are listed alphabetically followed by the sounds they sell. For each product, the name, price, and media (CD-ROM, audio CD, ROM cartridge, floppy disk, etc.) are listed, along with — where applicable — the specific sampler(s) or computer(s) the sounds are formatted for.

You'll notice some listings followed in parentheses with "also sold by" for those products sold by more than one company. This is the case with audio CDs and CD-ROMs that are developed and marketed by one company and also sold by other distributors. The product appears under the primary developer/distributor's section in the listings, followed by the names of other companies that also offer the product in their catalog. In particular, East-West Soundwarehouse distributes the work of a number of European developers in the U.S. and Asia, but contact information is also included (in the address list beginning on page 162) for the developers themselves, for the benefit of our European readers.

AKAI/IMC

Akai S3000-Series Sound Library, $9.95 per set, 3.5" disks, 150 sets of disks covering instrument families, styles, and sound effects. Akai S2800, 3000, 3200, CD3000, S1000/1100 (w/ version 4.3 or later).

Akai S1000/1100-Series Sound Library, $9.95 per set, 3.5" disks, 200 sets of disks covering instrument families, styles, and sound effects. Akai S1000, S1100, compatible with S2800, 3000, 3200, and CD3000.

MPC60 Sound Library, $9.95 per set, 3.5" disks, 30 sets of disks covering wide variety of drum and percussion kits. MPC60, MPC60 II, MPC3000.

ALESIS

Classical QuadraCard, $229, ROM card (8Mb).

Pop Rock Assorted QuadraCard, $229, ROM card (8Mb).

Stereo Grand Piano QuadraCard, $229, ROM card (8Mb). RamCard 1 (Virtual Composer Series), $129, RAM card (256K).

World Ethnic QuadraCard, $169, ROM card (4Mb).

AMG (dist. by East-West)

AbracaTabla, $99.95, audio CD.

AMG Budget Series 1, 2, & 3, $59.95 each, audio CD.

Art Of Sampling, $49.95, audio CD.

Black II Black 1 & 2, $199.95 CD-ROM, $99.95 audio CD, Akai.

Coldcut Kleptomania, $49.95, audio CD.

David Ruffy's Drums, $199.95 CD-ROM, $49.95 audio CD, Roland.

Freekee Jack Swing, $99.95, audio CD.

Funky Drums From Hell, $199.95 CD-ROM, $99.95 audio CD, Roland.

Global Trance Mission, $169, audio CD (2 discs).

Gota Yashiki, $99.95, audio CD.

Karma Chopra, $99.95, audio CD.

Kickin' Lunatic Beats, $99.95, audio CD.

Loup Soup, $99.95, audio CD (2 discs).

Megabass Remix & Remix II, $99.95 each, audio CD.

Pascal Gabriel 1, $49.95, audio CD.

Pascal Gabriel 2, $99.95, audio CD.

The Rhythm Of Life, $199.95 CD-ROM, $49.95 audio CD, Roland, Akai.

Rhythm Of Life 2, $99.95, audio CD.

Samplography, $49.95, audio CD.

Skip To My Loops, $99.95, audio CD.

Smokin', $99.95, audio CD.

Vince Clarke Lucky Bastard, $99.95, audio CD.

ANGEL CITY AUDIO

Analog Oasis, $20, data cassette, Korg Poly-61.

Diamonds, $39.50, data cassette, disk, data tables, all Yamaha DX synths/modules.

Diamond Mine, $62.50, data cassette, 3.5" disk, Yamaha TX81Z, DX11. Digital Oasis, $52.50, data cassette, Korg DW-6000. M3R Oasis, $42.50, program ROM card, Korg M3R.

Oasis, $42.50, program ROM card, Korg M1EX. Power Matrix, $39.50, data cassette, Oberheim Matrix-6, 6R.

Studio Drummer Rhythm Patterns, $42.50, data cassette, Alesis HR-16.

T Master Series Sound Disks, $269 (complete), $169 (mini-set),

$12.50–$39.50 per individual disk, 3.5" T-disks (programs and PCMs), Korg T1, T2, T3.

The 8000 Master Program Series, $85 (complete), $69.50 (Vol. 1-8 only), data cassettes, 3.5" disks, Korg DW-8000, EX-8000.

BEST SERVICE (dist. by East-West)

Alphadance, $99.95, CD-ROM & audio CD (2 discs), Akai.

Barbara Dennerlein Hammond B-3, $69.95, audio CD.

Bizarre Planet, $49.95, audio CD.

Brass Super Section, $199.95 CD-ROM, $99.95 audio CD, Akai, Roland.

Charged, $149.95, CD-ROM, Akai, E-mu.

Classical Choir, $199.95 CD-ROM, $99.95 audio CD, Akai, Roland, Ensoniq.

Clockwork, $49.95, audio CD.

Film FX Collection, $69.95, audio CD.

Gigapack 1, $399.95, CD-ROM (2-disc set includes 'Classical Choir'), Roland, Kurzweil.

Gigapack 2, $399.95, CD-ROM (2-disc set includes 'Hallelujah'), Roland.

Hallelujah, $199.95 CD-ROM, $99.95 audio CD, Akai, Roland, SampleCell.

Hyperdance, $99.95, CD-ROM, Akai.

Hyperspace, $99.95, CD-ROM, Akai. ►

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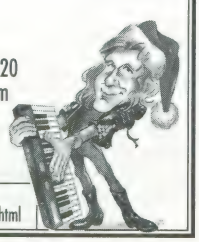

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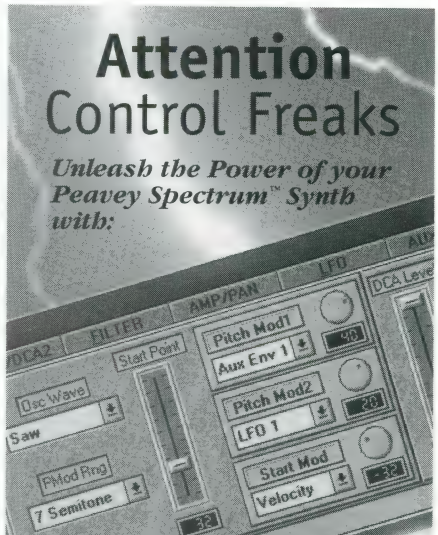

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Orchestral Colours, $199.95 CD-ROM, $99.95 audio CD, Akai.
Real Mega Drums, $99.95, CD-ROM & audio CD, mixed mode Akai/E-mu.
Science Fiction, $49.95, audio CD.
Sound FX Collection, $69.95, audio CD.
Stackware, $149.95, CD-ROM, Akai, Roland.
Ultra Gigapack, $399.95, CD-ROM (3 discs), SampleCell.
Voice Spectral, $49.95, audio CD.
World Colors, $199.95 CD-ROM, $99.95 audio CD, Akai.
XX-Large, $199.95 CD-ROM, $99.95 audio CD, Akai, Ensoniq.
XX-Large 2, $99.95, audio CD.
XX-Large Analog Dreams, $199.95 CD-ROM, $99.95 audio CD, Akai, Roland, SampleCell.

BIG FISH AUDIO
Akai Vol. 1, $199.95, CD-ROM, Akai.
The Analog Keyboard Bass, $69.95, audio CD.
Animalog Analog Grooves, $69.95, audio CD.
Asian Traditions, $99.95, audio CD.
B3 & More Vital Organs, $99.95, CD-ROM, SampleCell.
Brotherhood, $79.95, audio CD.
Church Organs, $299.95, CD-ROM, Akai.
Global Noize, $69.95, audio CD.
Global Sounds, $199.95, CD-ROM, Akai.
The Greene Machine 1, $69.95, audio CD.
The Greene Machine 2, $99.95, audio CD.
JD-800 Sounds, $199.95, CD-ROM, Akai S3000.
Jurassic Keys, $299.95, CD-ROM, SampleCell (also sold by East-West).
Killer Bites, $69.95, audio CD.
Loopzilla, $99.95, audio CD.
Megaton Bomb, $79.95, audio CD.
Neftali's Street, $99.95, audio CD.
The New Ambient Edge, $199.95, CD-ROM, Akai S3000.
The Orchestral Collection, $299.95, CD-ROM, Akai, Kurzweil.
Orchestral Strings, $199.95, CD-ROM, Roland, Akai (also sold by East-West).
ProFX, $299.95, CD-ROM, Akai, SampleCell.
Prosonus Drum Loops Vols. 1 & 2, $69.95 each, audio CD.
Prosonus Drum Loops Vol. 3, $79.95, audio CD.
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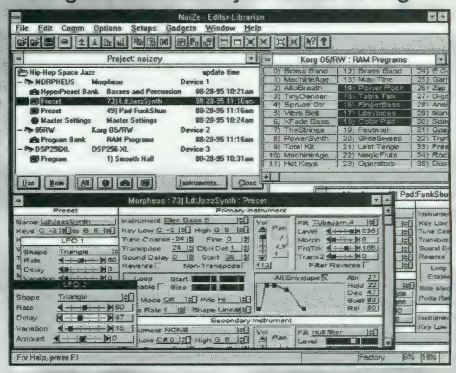

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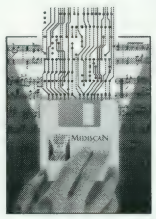

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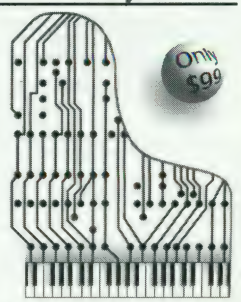

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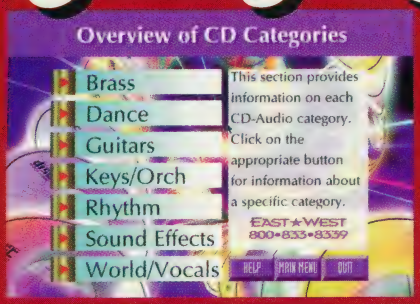

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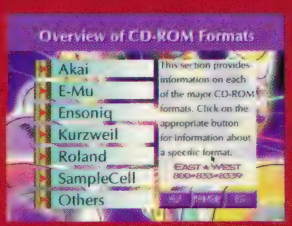

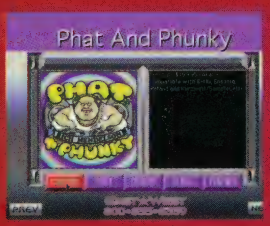

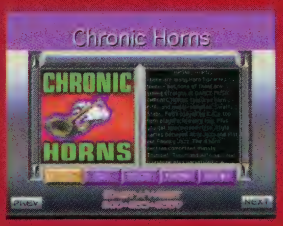

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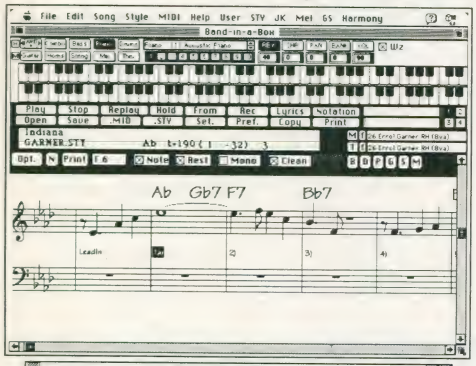

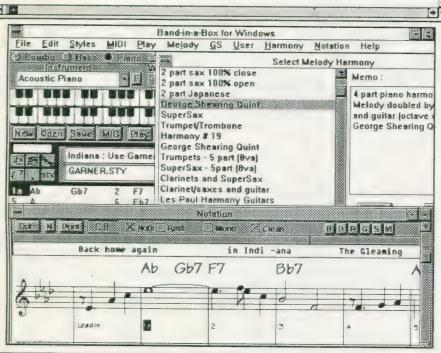

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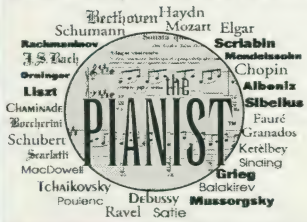

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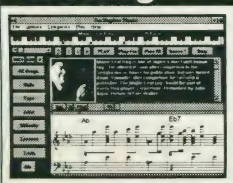

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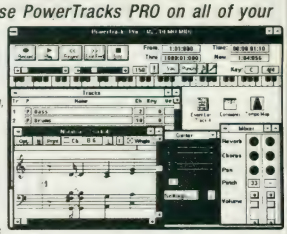

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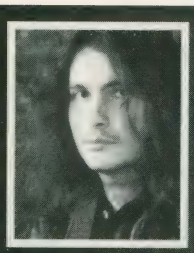

Name: Guido Zen. **Style:** This is my music; industrial metal (with the band Crime Of Normality). **Age:** 22. **Influences:** Peter Gabriel, NIN, Tangerine Dream, various hard rock bands, Massive Attack. **Main Instruments:** Akai S3200, Yamaha SY77, Macintosh IIsi w/Steinberg Cubase 2.5. **Contact:** Via XXIV Maggio, 12, 00046 Grotaferrata (ROMA), Italia.

Name: J. Sebastien Coté. **Style:** Atmospheric neo-electronic. **Age:** 25. **Influences:** Tangerine Dream, King Crimson (later period), Bach, Rush, Laurie Anderson, Brian Eno, Peter Gabriel, U2, Bill Bruford, Miles Davis, Pat Metheny Group. **Main Instruments:** Kurzweil K2000S, Yamaha DX7IIfd, TX81Z, Roland D-50, SPD-8, and TR-909, Korg M3R, Poly-800 and MS10, Atari and Mac computers. **Contact:** CP 66021, Quebec, Canada, G1R 1P8. JSC@cmq.qc.ca.

When I get recordings for Discoveries, I listen before I read anything. And after listening to the music of Sebastien Coté and Guido Zen, I was amazed to find that both are under 25 (at least when they produced their tapes). And that amazement is not at how good they both are — inspiration and excellence can be wielded by a teenager — but, rather, at the depth of their musical languages. Each has assimilated a wide-ranging and eclectic mix of influences and a seamless facility with these materials.

Coté, a largely self-taught percussionist, took up keyboards in the '80s, pulled in by the gravity of computers, synths, and electronics. "I'm not really a 'keyboardist' in the formal sense, but rather a 'key presser!'" Even so, his 1993 cassette album *Mirador* demonstrates adequate comfort at the keyboard (particularly on "Die Antwort") and a remarkable knack for "pressing" the right keys at the right time. Developed perhaps from years of playing percussion, his phrasing is smooth and energetic from start to finish. In fact, he's one of those rare musicians who never seems to drop the ball. And given that he's approaching the keyboard as a "pressing" of different keys, the outcome is all the more impressive. Everything seems perfectly in place: the vast array of percussion instruments and samples, the arpeggios (when they're there), the solos, and the melodies (which are full of wonderful rhythmical and intervallic surprises).

The even younger **Zen** (admit it, it's a catchy name) actually performs two different styles in two different contexts. Most of his musical effort goes into the band Crime Of Normality. But when one of the players moved to England and the rest (including Zen) went into the Italian national service (sort of civil service by conscription — could you imagine this in the States?!), he took time to put his own projects together until the band could be reunited in London.

The first of these projects, *Floodlight of Myself*, is like Coté's music in that it throws all sorts of elements in the pot. However, Zen is much more of a melodist. His melodies are sweet, sustained, dreamy, melancholy, and wistful. Yet he casts a frame around the melodies that throws a fiercer and more aggressive energy into the music. North African hand drum loops pop up here and there, drones evoking everything from evening prayers to industrial alleyways lurk and creep, and pointed, sharply cut bass and countermelody lines punctuate the pieces. Zen brings laughing and crying, pain and pleasure, yesses and nos wonderfully and yet uncomfortably close to one another.

With so much ability, what will they do next? Well, Zen is working on more of his solo music (including the tape *Moving Through Changes*) and looking forward to relocating to England this winter. (The Italian address is still valid, though.) "In Italy our kind of music doesn't have many opportunities. It is the style, but also we sing in English. Even so, our demo, *Still Around*, got some attention and good reviews. But mostly, I like the way of London."

Coté has some hopes but no immediate plans for new product. He has started on a new cassette — wearing his percussionist hat — with one of his accompanist colleagues at the l'Ecole de danse de Quebec for the classes at the school. "At the school I have to keep things simple because I move around so much." And that simplicity also permeates his music. "I've been listening to a lot of the ambient Eno music. And my music is slowing down and the drumbeat is less emphasized. The beat is still important, though. Even if it's not right there, the beat can be there in the delays and sequences. I even bought a guitar just to add more sustained sounds, and I 'bow' it with a knife to emphasize the texture. It makes my palette much more wide."

SHORT TAKES

Name: Charles Tobermann. **Style:** Contemporary Classical meets the Middle Ages somewhere in the Indian Ocean. **Influences:** $(3Bs)^2$ (Bach, Beethoven, Brahms and Bartók, Berg, and Boulez), Patsy Cline, the Benedictine Monks of Solesmes, the monks of the Temple of Buddha's Tooth in Kandy (Sri Lanka), John Coltrane, Bill Evans, Elliott Carter, Muddy Waters, Pope Gregory, Charles Ives, Mississippi John Hurt. **Contact:** La Claie Productions, 7 Bd. de Grenelle, 75015 Paris, France.

Tobermann serves up a rare musical blending of heady, dense rhythms and timbres with a rich, globally minded rhythmical framework. His short CD *Getting to Know Each Other* is at once disciplined and suave, sweet and prickly. Those who enjoy everything from soundtrack music to modern electronic composition and even new age will find gratifying moments as well as pleasurable surprises throughout the disc.

Name: David Gilden. **Style:** Hi-tech world folk. **Influences:** Mandinka music, late '70s electronic music, various classical ditties. **Contact:** 62 Capitol Street, Watertown, MA 02172.

On his 1991 CD release *Ancestral Voices*, Gilden presents a gentle, inviting mix of Indic, African, Mediterranean, new age, and jazz musics. Of particular interest is his integration of the Kora into a largely electronic soundscape. For those who don't know, the Kora is an instrument that resembles (in sound and appearance) a cross between a harp and a big lute, and is mostly played in Gambia and Mali. Gilden comes out of the Mandinka style from Gambia, where the instrument is often used for self-accompaniment by story-telling historians called griots. The sound is radiant, fluid, and unhurried, and this spirit permeates all 14 pieces on the CD, including those that have nary a whit of Kora playing in them. ■

Titus Levi, founder of the California Outside Music Association, spends his free time struggling through graduate economics courses at U.C. Irvine. If you'd like to appear in Discoveries, send a cassette or a CD of your best material, a letter indicating your full name, age, style, influences, performance credits, goals, and equipment, a publishable phone/fax number and address at which readers may contact you, and a clear black-and-white photo of yourself with your keyboard setup. Photos should be labelled with your name and the photographer's name and address. All styles of music will be considered. Due to number of submissions, material cannot be returned, and applicants will not be contacted unless accepted. Send all correspondence to Titus Levi, 5153 Hanbury St., Long Beach, CA 90808. Titus also invites Discoveries alumni to keep in touch with news about career advances.

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—Greg Rule, Keyboard Magazine. ★★★★★ Keyboard Magazine Review, Nov. 95

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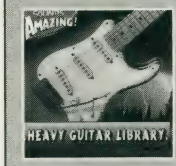

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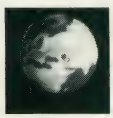

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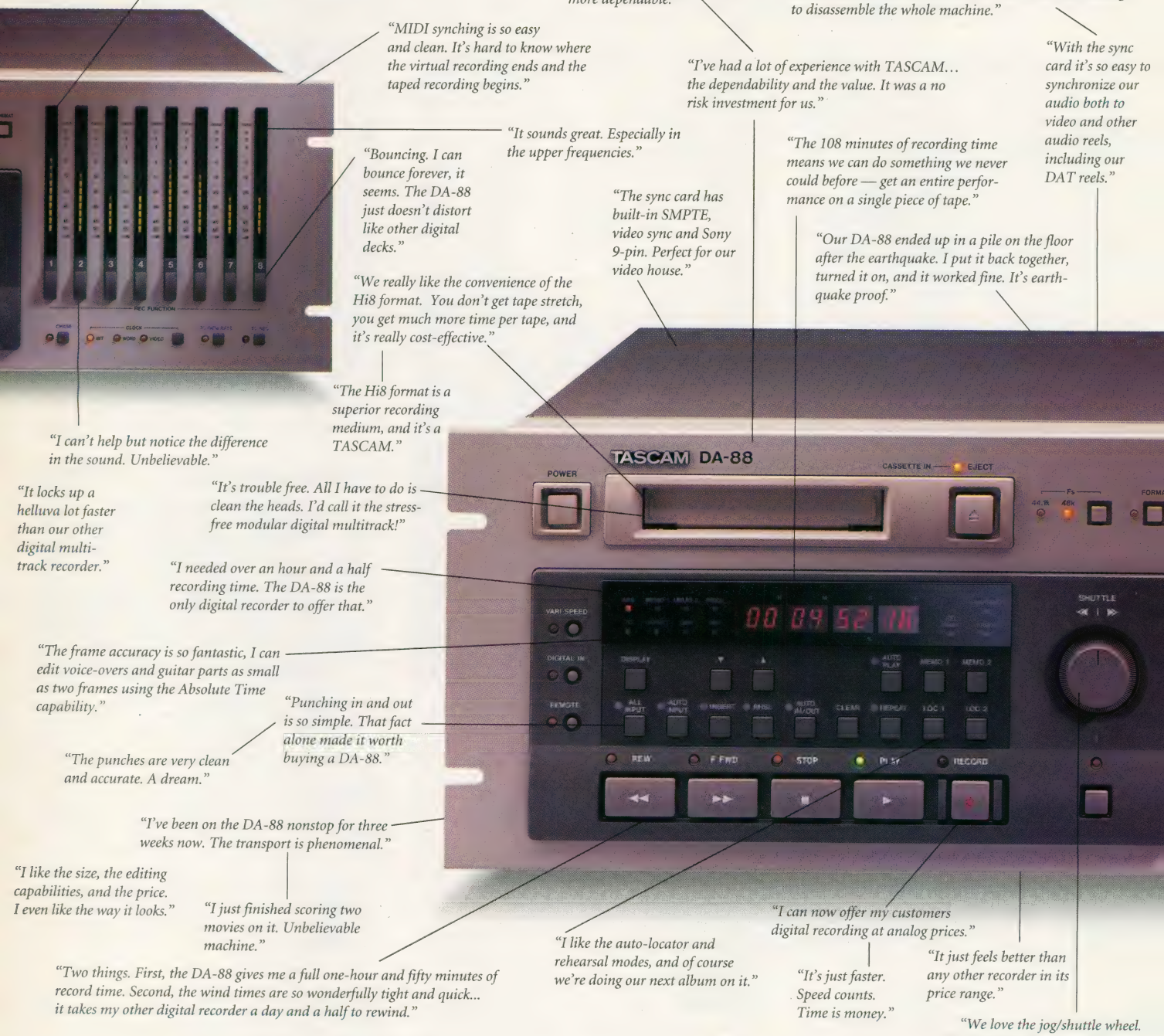

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letters

◄ Continued from page 88

Foreigner's "Long, Long Way from Home," Queen's "The Game," and Vangelis's "Pulsar."
Bill S.
Belmont, CA

Only a top 20? I wish you'd given us a lot more. What about A Flock Of Seagulls or Hall and Oates? Anybody remember Missing Persons?
Almost Nothing
Chattanooga, TN

Why was Depeche Mode noted simply as an "honorable mention" when they've been one of the toughest synth pop bands to undergo the changes of the '80s and '90s? Other bands would include New Order, Erasure, Yaz, Kraftwerk, Men Without Hats, the Cars, and C&C Music Factory, which have formed part of the chisel that has shaped electronic music. Some of these bands have been around for over a decade, and not even an honorable mention?
Todd Beagle
Rohnert Park, CA

How could you leave out "Love Stinks" by the J. Geils Band? This song has one of the most fantastically gnarly synthesizer solos in all of music. How about "I Can See Clearly Now" by Johnny Nash? Until recently, I thought those

Continued on page 198 ►

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Music Lessons gets an A-plus
Macworld, November 1991

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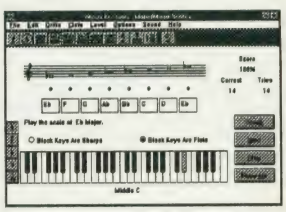
David M. Rubin, The Desktop Musician, Osborne McGraw-Hill, Berkeley CA 1995



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solo piano

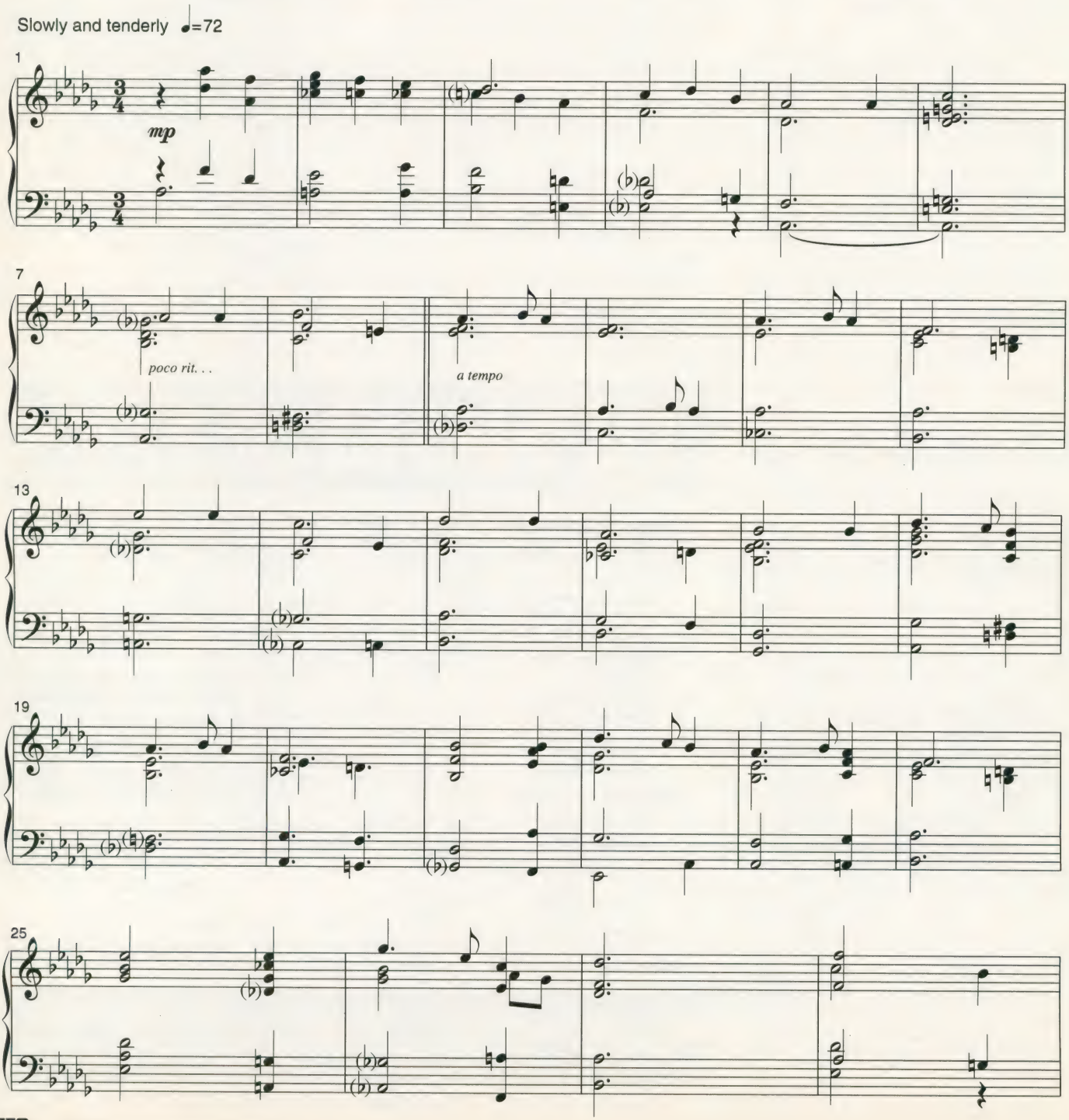
FRED HERSCH

Cool Sounds for a "Silent Night"

Season's greetings from Solo Piano. In keeping with the season, here's my arrangement of a beautiful holiday melody by Franz Gruber, "Silent Night." I've tried to strike a balance between traditional harmony and jazzier changes, incorporating some of the things I've mentioned in previous Solo Piano columns, such as substitute chords, four-part harmony, voice leading, and voice balance.

Try this approach for learning the piece (this works for learning just about *anything* at the piano):

1. Split the voices in the treble staff between your right and left hands, ignoring the bass staff.
2. Split the voices of the bass staff alone between your right and left hands.
3. Play the melody alone.



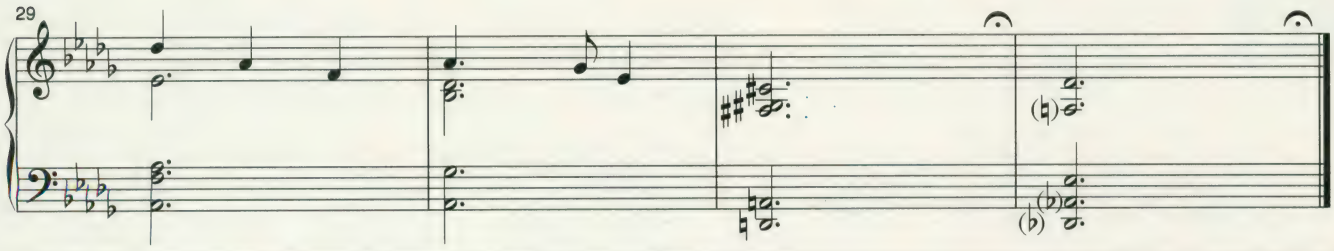
4. Play all the voices except the melody.
5. Play the entire piece as written.

An optional but highly recommended step is to transpose individual phrases or the entire piece.

This step-by-step approach will insure that you'll really hear all of the voices as they move. When performing the tune, take a nice leisurely pace, don't over-pedal, and remember to balance all of the voices.

Wishing you a happy, healthy, and musical New Year!

Fred Hersch's trio and quintet can be heard on his latest release, Point in Time *(Enja). The disc features new originals and fresh arrangements of classic standards and tunes by Wayne Shorter, Jimmy Rowles, and Thelonious Monk.*



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composing

RICHARD LEITER

Jumpstart Your Writing

There comes a time in every writer's life when you're just not firing on all eight cylinders. Maybe you've been writing too much, maybe you've been away from the keyboard too long. Maybe it's biorhythms. The tides. Solar winds.

No matter. Creativity flows in cycles, and this sort of mental stagnation clogs every brain now and then. When my sludge builds up, I blow out my tubes with a little system that really works.

It takes two weeks, and requires both a bit of discipline and a sense of play. It's like boot camp for composers, but if you embark on this adventure you'll wind up as a lean, mean composing machine with a whole bunch of new ideas. I'll illustrate the system with songs, but you can apply it to any style of music, be it chamber music, new age, or jazz.

Twelve Steps to Heaven

Here's what you do: On each of 12 little slips of paper, write down the name of one pitch of the chromatic scale, *A*, *B♭*, *B♮*, etc. Put them in an envelope labeled "KEYS."

Next, on each of 12 more slips of paper, write down 12 styles of music or the names of 12 artists you'd like to write for. In the past, some of my styles have been Bordello New Orleans R&B, Queen Latifa Mid-Tempo Rap, Whitney Houston Gospel Ballad, Garth Brooks Country Rock, Broadway Show Stopper, and Boyz II Men Doo Wop. Get the picture? Slip these into an envelope marked "STYLES."

I suggest that you pick styles you wouldn't ordinarily write in, but don't pick a style that you have contempt for either. You have to have heard at least one tune in a style that has knocked you out, and you should be a little challenged by writing in the new style. For instance, if a lot of your stuff typically sounds like Nine Inch Nails, don't pick that style as one of your choices.

Finally, write down 12 subjects you are intensely interested in. Look hard. Don't make them all different aspects of your wonderful new lover. Try to search for people, things, places, and situations that have a sharp emotional charge for you. Some of my subjects in the past have included: Crime In The Street, My Mother, Baltimore (where I grew up), Dogs, and Cheesesteak Sandwiches. They can be light-hearted, but they should be something you care about. Slip these pieces of paper into an envelope marked "SUBJECTS." Set all three envelopes aside.

Follow The Rules

Find a two-week period when you can set aside a couple of hours a day to write. The purpose of this is not to write the next hit single, though you shouldn't completely dismiss the possibility of this happening. You'll be using unfamiliar styles, keys, and methods to force yourself into new places. Here are the rules:

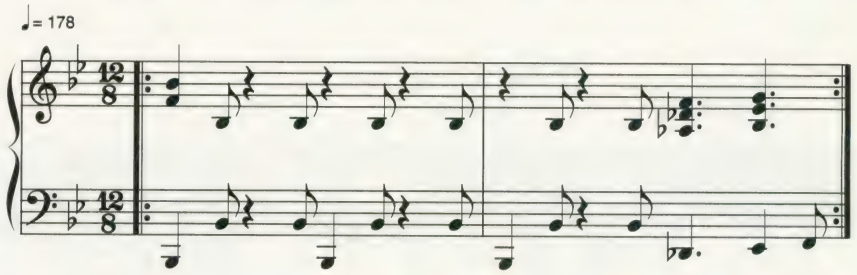
1. Every day, draw from your envelopes a key, a style, and a subject. What you draw is what you get. No exceptions.

2. Flip a coin. Heads for major, tails for minor.

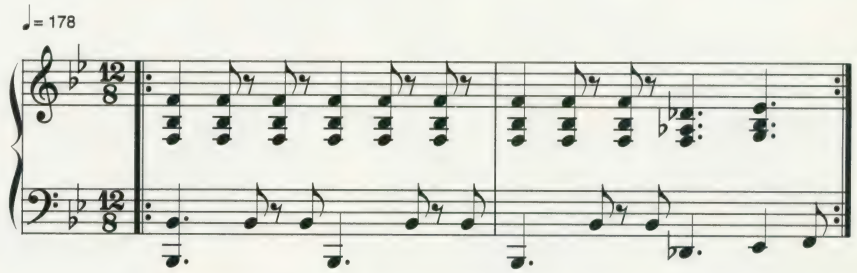
3. Write one song a day, no more, no less. A song is complete when you have a rough tape of the entire song and a written lyric sheet.

You must finish the song in one day. It can be a lousy song, or it can be a great song. But you must sing the whole song onto a tape and you must write down all the words. You can't leave out even one word or one chord. Them's the rules. A song a day, no matter what.

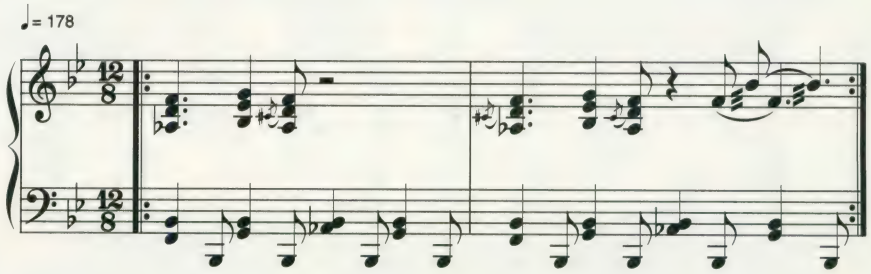
Ex. 1. Altering your accompaniment figures slightly can inspire a wide variety of melodic ideas. This is a basic Texas-style shuffle. Simple yet rhythmic, this figure begs for a growling vocal sitting on a flat third.



Ex. 2. The same feel, but more active. The right-hand voicing makes this one sound more like a drum loop than a piano part. I hear a hook that takes my voice up into the stratosphere; how about you?



Ex. 3. This variation has a much more laid-back feel, even at the same tempo as Ex. 2. Picture Rickie Lee Jones mumbling a clever rhyme, always a little behind the beat.



No Pain, No Gain

It's Day One. From your KEYS envelope, you draw *B♭*. Your coin toss comes up heads, so you're going to write in *B♭* major. From your STYLES envelope, you draw Bar Band Rock Shuffle, and from the SUBJECTS envelope you draw My Car. You say to yourself, "In the next two hours I will write a Bar Band Rock Shuffle about my car in the key of *B♭* major. [This is actually an assignment I once drew.] Even if a nuclear bomb goes off and I can't run my sequencer, I will write that song!"

You can start anywhere, with a chord progression, a feel on your drum machine, or a snippet

All lyrics and music ©1995 Richard Leiter/Hotchacha! Music.

of melody. I like to start with words, then come up with a strong chorus hook that says what I want to say (about my car, in this case), and work backwards from there. You can start with a bass line and work your way up, or attack the assignment from any direction that appeals to you.

Let's say that in your first five minutes you come up with the title and hook to "Take Me to the Freeway." Sit down at the Steinway and play a rock shuffle feel. Play several variations of the feel, and notice how each one suggests a different melodic direction (see examples).

You'll probably start to generate a verse and chorus, get some lyrics and then . . . stop. At this point, you might ordinarily say, "I've done a good day's work. It's Miller time," and leave the rest of the song for another day. After all, you wouldn't want to risk rushing the completion of a masterpiece.

Risk it, rush it. It's not a masterpiece, it's Day One. If a chord progression doesn't flow, force it. You will begin to consider desperate options, and out of those new directions will grow fresh ideas. When you have written a complete melody, chord chart, and lyric sheet, tape a rough vocal. Then and only then can you call it a day. Even if you have to write a bunch of "moon and June" lyrics or a less than original melody, just do it. Finishing the song will allow new thoughts to come through the next day.

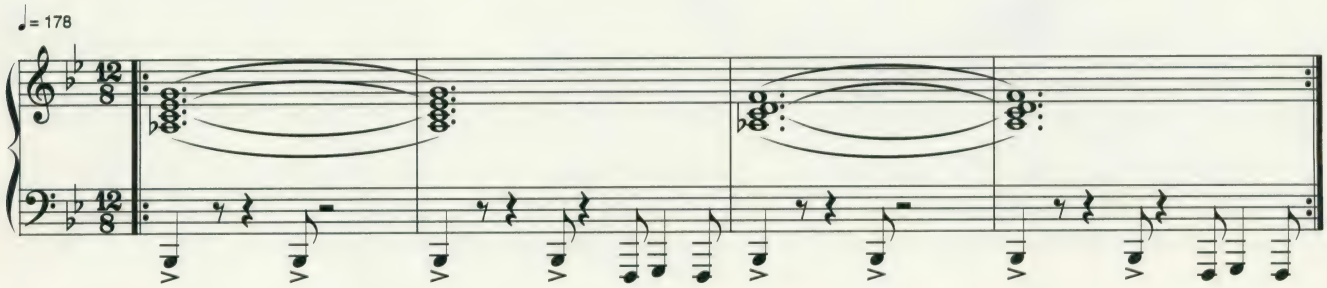
Variations on a Theme

It's important that you have envelope categories that are stimulating. One time, instead of using styles, I used pre-recorded drum tracks. Another time I just used artist names. The last time I did it for a whole month using both major and minor modes of all 12 keys.

Don't worry if your songs drift from the target style, or if a lot of them feel less than perfect. This is a training program. By the end of the two weeks, your writing will be loose and confident. Let me know how the system works for you, c/o *Keyboard*, and don't forget your new mantra: Finish the song! ■

As a composer and songwriter, Richard Leiter has done projects for a wide variety of clients, NPR, Honda, Carl's Jr., ABC/TV, and Inglenook Wines among them. He writes and performs in California.

Ex. 4. Same tempo and feel, but we're a world away from Ex. 1. The suspended third of the B♭9add13 *resolves in bar 3, adding tension and release to the accompaniment formula. No screaming here; how about something that touches on the 9ths and 11ths?*



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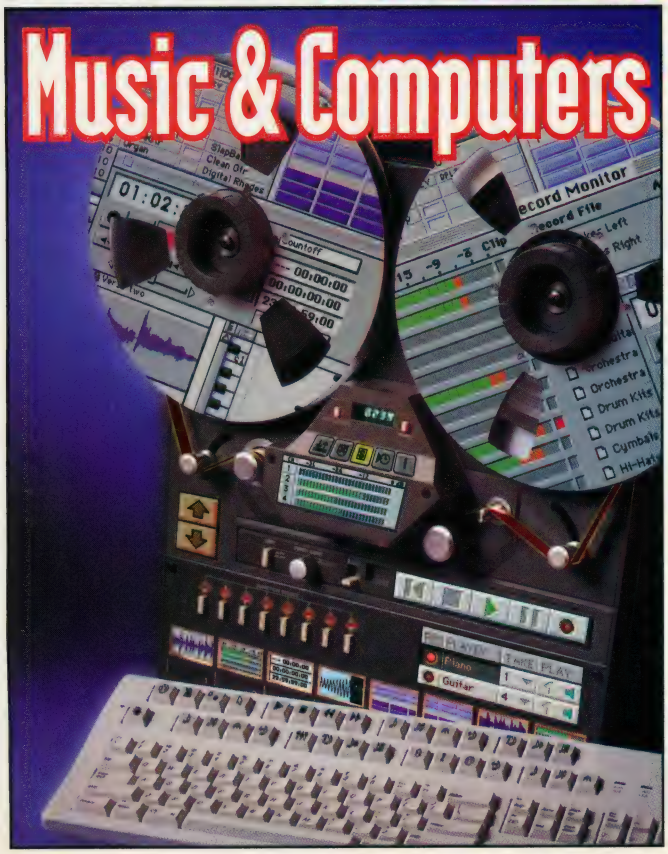

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- **General MIDI** — Shopping for a synth? Here's why General MIDI compatibility is important. Plus: overviews of seven powerful GM instruments.
- **Soundcard Secrets: Gravis UltraSound** — Maximize sound quality, create stereo samples and "instant jamulators," and discover the sneaky echo envelope.
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reel world

JEFF RONA

Sync Up

It's come to my attention that there are still a few common misunderstandings about how to use SMPTE timecode properly when scoring to picture, so I thought it would be useful to go over a few of its peculiarities. Keep in mind that the correct use of timecode is one of the backbones of TV and film scoring. Do it wrong and you could end up in the unenviable position of having to rerecord an entire score. But fear not, intrepid wanderers, there are just a few points to ponder and a few myths to bust, and you can avoid a syncing disaster.

Any time you are asked to put music to picture, you should be given a videotape of the final edited version with a SMPTE timecode track on one of the audio channels. You'll need a decent stereo VCR to play the tape back. 3/4" tape machines have the advantage of including a special third audio channel exclusively for timecode. The channel with the timecode is patched to whatever device you use to lock your sequencer to tape. These days most every computer MIDI interface comes with timecode-reading capabilities. And while most interfaces can also generate timecode, this should be used for striping audio tape only. Don't make the mistake of thinking that you can put timecode onto a videotape as part of any film or video production; your timecode numbers will not match the numbers everyone else is using, and you will get yourself into trouble.

Most sequencers allow you to select the type of SMPTE timecode you will be syncing to. Set it wrong and your music may not sync up with everything else by the end of the post-production process. If you live in America (North or South), Asia, or a few other assorted continents, the timecode found on a videotape is running at 29.97 frames per second. No exceptions. Even if the tape is labeled "30 fps" or is in black & white (very arty these days), it really is still 29.97. Set your sequencer accordingly. Some projects use SMPTE timecode in a format called "drop frame" (sometimes labeled as "df") while others are done in "non-drop frame" (labeled as "ndf" or "nd"). While your sequencer may be able to tell these apart, you should double-check with whoever gave you the tape to be certain. Once again, be sure to set your sequencer accordingly. You'll be glad you did.

Feature films are, with virtually no exceptions, transferred to video with 29.97 *non-drop frame* SMPTE timecode, while projects headed to television are virtually always post produced using *drop frame* timecode. Again, it's very important for you to check and confirm what is on the tape you get.

With the formalities of SMPTE timecode "flavors" taken care of, you're ready to start composing your score with your sequencer locked to your VCR. Each cue you write will have a "Start Time," sometimes called an "Offset," which will tell the sequencer exactly where in the film to begin. I suggest strongly that, even though you can do all your scoring while watching picture (your loyal sequencer flawlessly slaved to the tape), it's a good idea to give the video a rest from time to time and just write. This helps keep an organic feel to the music, so it doesn't become nothing but a slave to the picture. After you've gotten some notes out of your system and into your computer, set your sequencer to lock to the tape again and see how it fits the scene. Make your fixes and try it again.

When you deliver your music mixes back to the project's production company, there are quite a few potential variables that you need to take into account. Before you prepare to record your music, you should always talk to the people to whom you will be giving your music in order to be sure it is mixed in a format they're able to deal with. Digital 8-track recorders such as the Alesis ADAT and TASCAM DA-88 have become very popular ways to deliver music for film and TV. With these machines you can deliver mixes with two or more tracks along with SMPTE timecode. Most productions also want a track with the timecode that matches the music's placement in the movie, which are the start times you set on your sequencer. You must also include about 30 seconds of timecode prior to the start of the music (called "preroll") and 30 seconds past the end of the cue (called "postroll"). These are needed by the machines used to transfer your music onto the final master tapes. These tapes will also include dialog and sound effects. If you write a two-minute piece of music that starts at 01:07:12:05 (SMPTE timecode is noted in the format "hours:minutes:seconds:frames"), then you would want to deliver your music on a tape with timecode that starts at approximately 01:06:42:00 and runs until 01:09:42:00. You should always leave 15 to 30 seconds between cues. Many TV shows now want the music delivered on an 8-track digital tape with one hour of continuous timecode starting at 01:00:00:00. Because these machines have excellent synchronization capabilities, the music does not need to go through a transfer to another master tape.

There is a convention used in films in regard to the hour number of the timecode. Films are broken down into several reels while they are being edited and mixed. Most all film companies make the SMPTE hour the same as the reel number, which makes it a little easier to navigate through the many tapes you may be working with. For example, a cue that starts a minute and a half into the third reel of the film would have a start time of 03:01:30:00. TV shows normally use a SMPTE hour of 01.

Speaking of film reels, it is often required that there be no music that crosses between the reels. This avoids the possibility of an audible glitch where one reel ends and the next begins. If you are uncertain about a piece of music that might need to cross over a reel change, check with the production people first.

I've had projects come in with the timecode mislabeled, and I've also been given wrong information by the editors. It's really important to check and double-check the information if you're the least bit unsure.

I hope you've enjoyed these oversimplifications as much as I've enjoyed paraphrasing them for you. Actually, if you remember these ideas, you may well be on your way to delivering a perfect master tape each and every time. Ignore me and pay the price!

If you want to learn more fascinated facts about timecode and how to avoid getting fired over it, let me recommend *Synchronization from Reel to Reel*, a book written by yours truly and published by Hal Leonard Books. The new, updated edition goes into far greater detail about all aspects of synchronization for video, film, and audio. You can find it in music stores, technical book shops, and specialty book stores. Until next time, remember: A timecode by any other name would last just as long. ■

Jeff Rona is a composer and synthesist in Los Angeles. He is a past chairman of the MIDI Manufacturers Association, and coordinates the UCLA Extension Electronic Music Program. In his spare time he has scored the music for Chicago Hope, Homicide, *and other shows. He can be reached at jrona@aol.com.*

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CRAIG ANDERTON

Mama's Got a Squeezebox

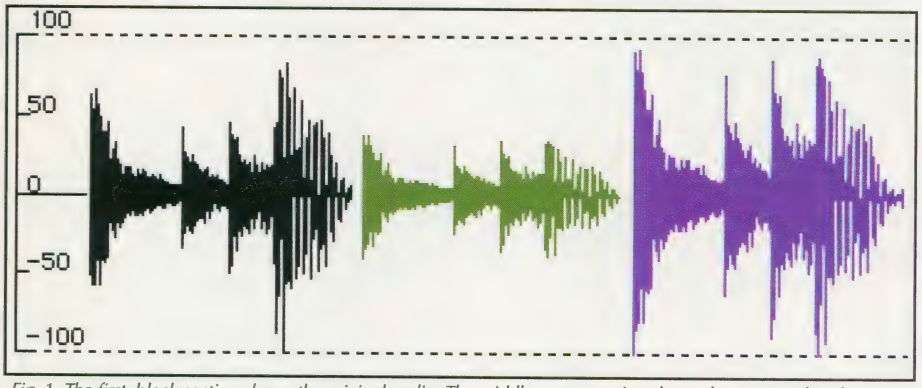

Fig. 1. The first, black section shows the original audio. The middle, green section shows the same audio after compression; the third, blue section shows the same audio after compression and turning up the output control. Note how softer parts of the first section have much higher levels in the third section, yet the peak values are the same.

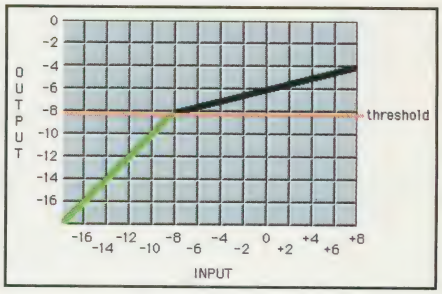

Fig. 2. The threshold is set at -8dB, and the compression ratio is 4:1. If the input increases by 8dB (e.g., from -8 to 0), the output only increases by 2dB (from -8 to -6).

It's one of the most used, and most misunderstood, signal processors. While people use it to make a recording "punchier," it often ends up dulling the sound instead because the controls aren't set optimally. And it was supposed to go away when the digital age, with its wide dynamic range, appeared.

Yet the compressor is more popular than ever, with more variations on the basic concept than ever before. Let's look at what's available, pros and cons of the different types, and applications.

My Main Squeeze

Compression was originally invented to shoehorn the dynamics of live music (which can exceed 100dB) into the restricted dynamic range of radio and TV broadcasts (around 40-50dB), vinyl (50-60dB), and tape (40dB to 105dB, depending on type, speed, and noise reduction used). As shown in Figure 1, this process lowers only the peaks of signals while leaving lower levels unchanged. A second process — which could be a gain-normalization utility if the compressor is implemented in software, or an output volume knob on a hardware unit — then boosts the overall level to bring the signal peaks back up to maximum. (Bringing up the level also brings up any noise as well, but you can't have everything.)

Even though media such as the CD have a decent dynamic range, people are accustomed to compressed sound. Compression is also useful to help soft signals overcome the ambient noise in typical home listening environments. Furthermore, analog tape has an inherent, natural compression that engineers have used (consciously or not) for nearly half a century.

There are other reasons for compression. With digital encoding, higher levels have less distortion than lower levels — the opposite of analog technology. So when music is recorded into digital systems (tape or hard disk), input compression can shift most of the signal to a higher overall average level to maximize resolution.

Compression can create greater apparent loudness. (Commercials on TV sound so much louder than the programs because they are compressed without mercy.) Given a choice between two roughly equivalent signal sources, people will often prefer the louder one; radio stations will compress the signal not just for bandwidth reasons, but to make the signal fly out of the speakers. And of course, compression can smooth out a sound — from increasing piano sustain to compensating for a singer's poor mic technique.

Compressor Basics

Compression is often misapplied because of the way we hear. Our ear/brain combination can differentiate between very fine pitch changes, but not amplitude. So, there is a tendency to overcompress until you can "hear the effect," giving an unnatural sound. Until you've trained your ears to recognize subtle amounts of compression, keep an eye on the meters. You may be surprised to find that even with 6dB of compression, you don't hear much apparent difference — but bypass the sucker and you'll hear a change.

Compressors, whether software- or hardware-based, have these general controls:

Threshold sets the level at which compression begins. Above this level, the output increases at a lesser rate than the corresponding input change. Bottom line: With lower thresholds, more of the signal gets compressed.

Ratio defines how much, when the input signal rises above the threshold, the output signal level changes for a given change in the input level. For example, with 2:1 compression, a

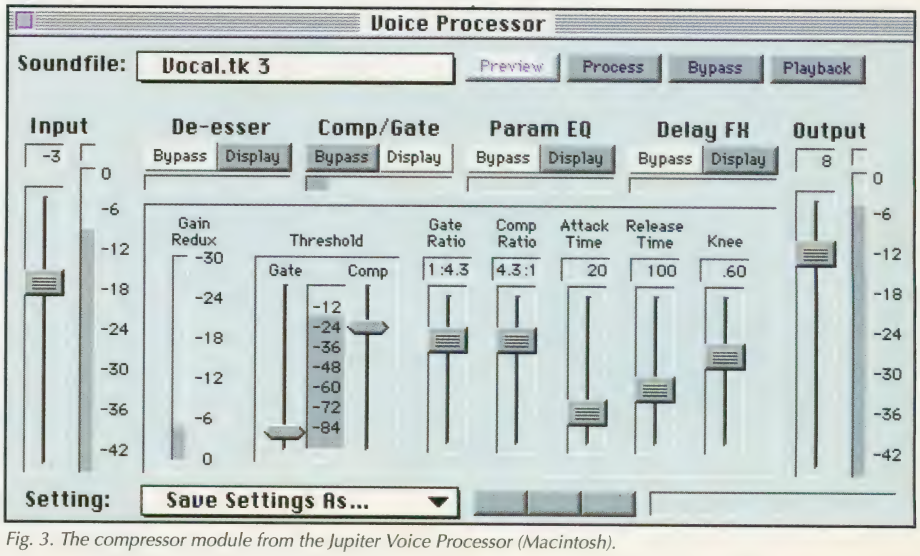

Fig. 3. The compressor module from the Jupiter Voice Processor (Macintosh).

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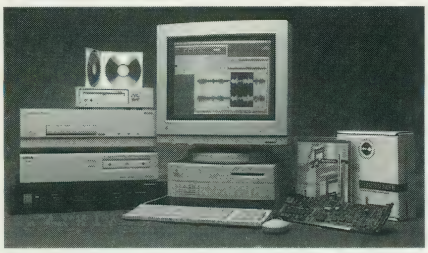

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2dB increase at the input (assuming that the input is higher than the threshold) yields a 1dB increase at the output. With 4:1 compression, a 16dB increase at the input gives a 4dB increase at the output. With "infinite" compression, the output remains constant no matter how much you pump up the input. Bottom line: Higher ratios increase the effect of the compression. Figure 2 shows how input, output, ratio, and threshold relate.

Attack determines how long it takes for the compression to start once it senses an input level change. Bottom line: Longer attack times let more of a signal's natural dynamics through, but those signals are not being compressed. In the days of analog recording, the tape would absorb any overload caused by sudden transients. In digiland, those transients clip as soon as they exceed 0 VU. With short attack transients, this may not produce any significant audible degradation (that sound you hear is thousands of mastering engineers recoiling in horror). If there is distortion, lower the overall level with the . . .

Output control. Since we're squashing peaks, we're actually reducing the overall peak level. Increasing the output compensates for the volume drop. Turn this control up until the peak levels of the compressed signal match the peak levels of the bypassed signal.

Decay sets the time required for the compressor to give up its death grip on the signal once the input falls below the threshold. Short settings are great for special effects, like those psychedelic '60s drum sounds where hitting the cymbal would create a giant sucking sound on the whole kit. Longer settings work well with program material, since the level changes are more gradual and produce a less noticeable effect.

The *hard knee/soft knee* option controls how rapidly the compression kicks in. With soft knee, when the input exceeds the threshold, the compression ratio is less at first, then increases up to the specified ratio as the input increases. With hard knee (as illustrated in Figure 2), as soon as the input signal crosses the threshold, it's subject to the full amount of compression. Bottom line: Use hard when you want to clamp levels down tight (for instance, to prevent clipping in a power amp), and soft when you want a gentler compression effect.

Side chain jacks are available on many hardware compressors. These let you insert filters in the compressor's feedback loop to restrict compression to a specific frequency range. For example, if you insert a highpass filter, only the high frequencies are compressed — perfect for de-essing vocals.

The *link* switch in stereo compressors switches the mode of operation from dual mono to stereo. Linking the two channels together allows changes in one channel to affect the other channel, which is necessary to preserve the stereo image.

Figure 3 shows the compression module from the Jupiter Voice Processor, a plug-in for Sound Tools running on the Mac. This is a typical setting used for vocals. There was close to -6dB of noise reduction at the moment this screen shot was taken, as shown by the Noise Redux meter. There are the expected threshold, ratio, attack, release, knee amount, and output

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controls; this module also includes a noise gate section with its own threshold and ratio controls.

Compressor Types: Thumbnail Descriptions

Compressors now come in both hardware varieties (usually a rack-mount design) and as software "plug-ins" to existing digital audio-based programs. Following is a description of various compressor types, along with some common models.

• *Old faithful.* Whether rack-mount or software-based, typical features include two channels with gain reduction amount meters (yes! lots of blinking lights!) that show how much your signal is being compressed. Typical hardware models include the Alesis 3630, dbx 166, and Aphex Compellor; for software, Digidesign's Sound Tools comes with a built in compressor, and the Waves L1 is a very sophisticated compressor plug-in for Sound Tools or Pro Tools. Hot tip: When compressing a stereo mix, blend in some dry, non-compressed sound for a livelier, more dynamic sound.

• *Multiband compressors.* These divide the audio spectrum into multiple bands, with each one compressed individually. This allows for a less "effected" sound (for example, low frequencies don't end up compressing high frequencies), and some models let you compress only the frequency ranges that need to be compressed. Dolby's 740 Spectral Enhancer offers a superb hardware implementation of this concept. In software-land, the Jupiter Systems MDT (multiband dynamics tool) plugs into Digidesign programs.

• *Octal compressors.* Now that every man, woman, and child on the face of the earth has an 8-track digital recorder, accessories were sure to follow. The Symetrix 488 and ART MDM-8L house eight compressors in a single rack space. These help reduce the possibility of overload for signals going into your recorder, as well as bringing back some of the tape compression effects associated with analog tape (minus the distortion). These units are overkill if you're overdubbing tracks one or two at a time (just get a good stereo compressor), but for live recording, they can literally save a session.

• *Vintage & Specialty Compressors.* Some swear that only the compressor in an SSL console will do the job. Others find the ultimate squeeze to be a big bucks tube compressor, like the Demeter or Groove Tubes models. And some can't live without their Dan Armstrong Orange Squeezer, held by many to be the finest guitar sustainer ever made. Fact is, all compressors have a distinctive sound, and what might work for one sound source might not work for another.

Whatever kind of audio work you do, though, there's a compressor somewhere in your future. Just don't overcompress — in fact, avoid using compression as a cop-out for bad mic technique or dead strings on a guitar. I wouldn't go as far as those who diss all kinds of compression, but it is an effect that needs to be used subtly to do its best.

Craig Anderton's latest book is Multieffects for Musicians *(AMSCO). He spends a lot of time hanging out in cyberspace at his AOL site, "Craig Anderton's Sound, Studio, and Stage" (keyword SSS).*

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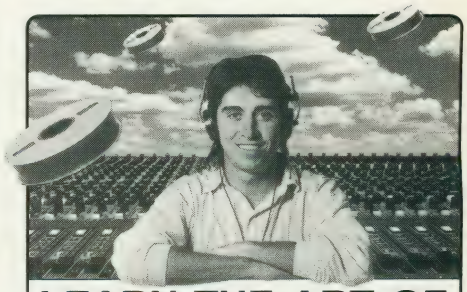

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inside the music

DAVE STEWART

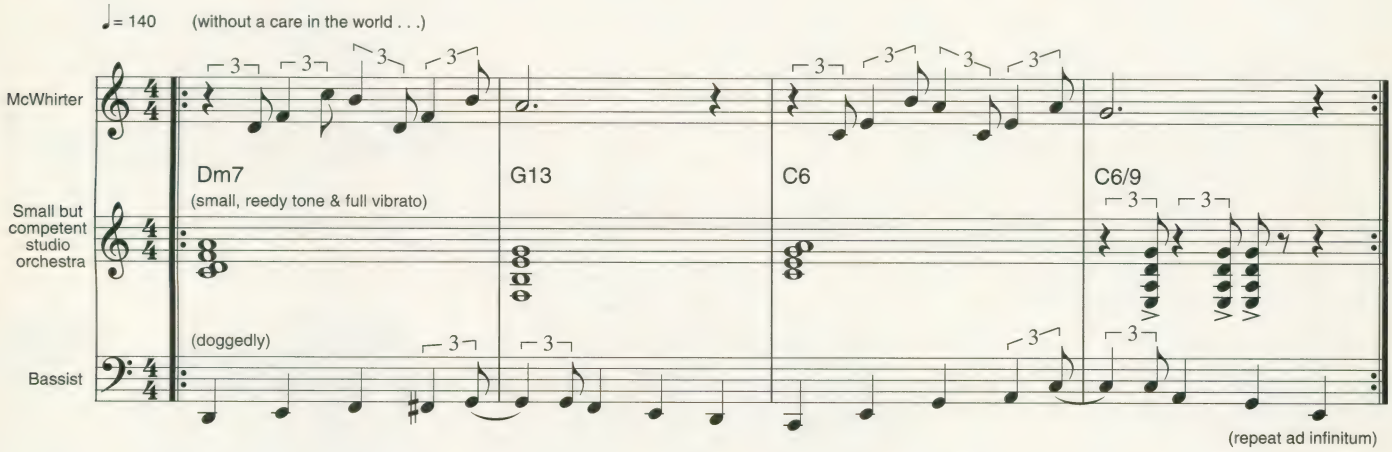
Your Majesty Is Like A Cream Donut

It is always a pleasure to receive letters from readers, but when the subject matter is the legendary Eric McWhirter, the pleasure turns to sheer ecstacy. Michael R. Smith, who lives in a post office box in Sylmar, CA, has sent in this exciting addition to the fast-growing McWhirter archive: *"Dear Mr. Dave Stewart/ Keyboard, I am flushed with excitement as I write this letter. Enclosed you will find a cassette of one of Eric McWhirter's rare studio recordings I found in a tape vault at my work. Originally recorded for the Musak company, a brilliant young Los Angeles City College film student (Rick Rafanovic) realized its enormous emotional potential and featured it in his 1989 student film 'The La Brea Woman.' (This is true!) Although used as a source cue, this piece brought the tedious grocery shopping scene to life.*

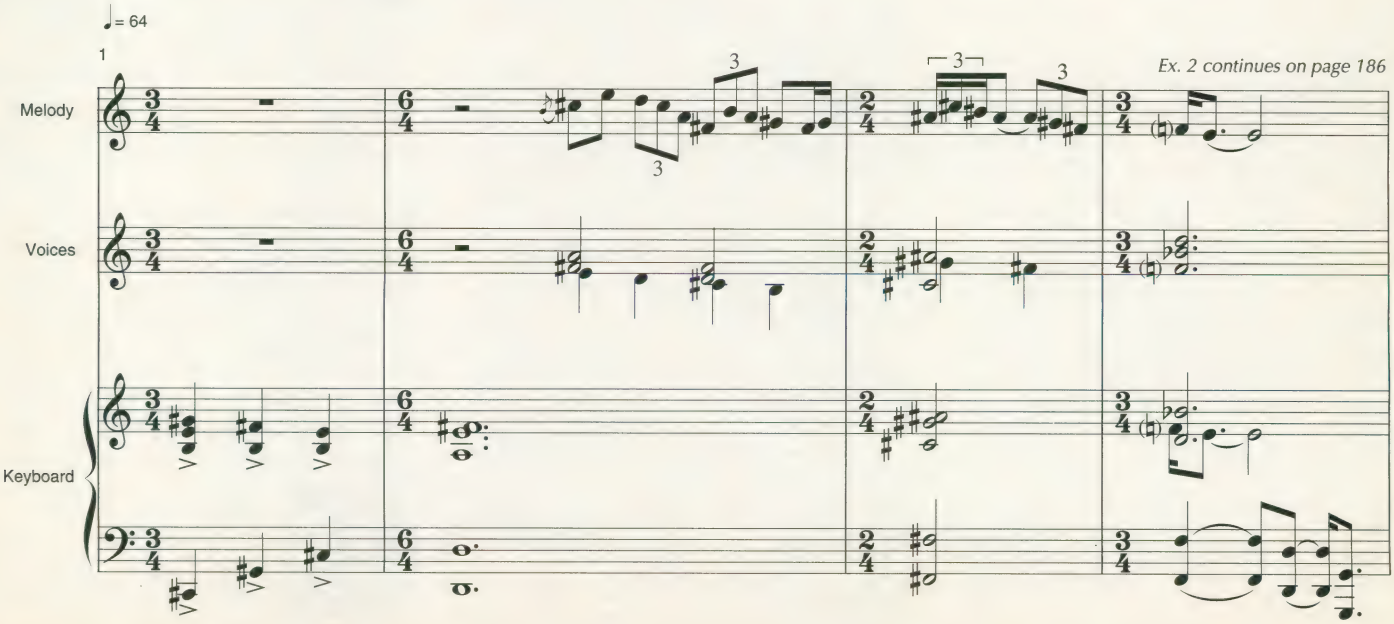
"Performing for the first time with a small (but competent) studio orchestra, McWhirter really pulls out all the stops in this Elvis Presley tour-de-force. Just one listen to the catchy organ counter-melody in the chorus, the bold triad-based solo, or the hook-laden riffing in the fade-out and you've got to ask yourself: 'Is this guy a home organ genius?' ERIC LIVES! Enjoy."

The tune in question is "Don't Be Cruel," and McWhirter's rendition beggars belief. Rejecting the cynicism of the original, our maestro of the elegantly styled walnut veneer home console opts for a light, breezy, deceptively bland touch which perfectly evokes the wholesome,

Ex. 1. Eric McWhirter's intro-cum-playout to "Don't Be Cruel." (Elvis's publishers please note: These four bars consist entirely of original material composed by Eric McWhirter, so don't start hassling us for money.)



Ex. 2. An extract from one of Stewart's compositions, "Your Majesty Is Like a Cream Donut."



Ex. 2 continues on page 186

"Your Majesty Is Like a Cream Donut," words and music by Dave Stewart. Copyright © 1975 EMI Virgin Music Ltd. All Rights Controlled and Administered by EMI Virgin Songs, Inc. All Rights Reserved. International Copyright Secured. Used by Permission.

sanitary mood of a modern suburban supermarket. To give you a flavour of this transcendental performance, we have transcribed the intro-cum-playout (see Example 1).

After despatching the hip-swivelling rock-aballad with his customary panache (at several points cleverly working one or two white notes into his trademark black-note mode), Eric (dubbed "The Paganini of the Farfisa Beaumont" by the *Fife Examiner*) tears into the playout with ferocious abandon, using the intro's melodic motif as a basis for improvisation. Appearances can be deceptive, and a casual listener might get the impression that the Scots genius is simply playing the intro over and over again. Not so. McWhirter cognoscenti will explain that the apparent mindless repetition conceals a wealth of small variations, 'micro-changes' which are barely discernible by the untrained ear. Whatever the technical explanation, this stunning McWhirter performance had its usual effect: From the first shrilling note, my eyelids drooped, my heartbeat slowed, and within seconds I had fallen into a deep sleep from which I awoke many hours later, spiritually cleansed and ready to boogie. On behalf of Eric's fans everywhere, a big thank you to Michael Smith for this little gem. The McWhirter mythos is growing, and any information on the great one will be gratefully received and reprinted on these pages. (Well, it saves me having to write the column.) Though the current trend at the magazine favours product reviews over mere human performers, it can only be a matter of time before Eric McWhirter assumes his rightful position on the front cover of *Keyboard*. [*Ed. Note: Over my dead body.*]

It is embarrassing to bring up one's own mundane compositions after dealing with the work of a living legend, but I thought some of you might be interested in examining this extract from a score from years back. (See Example 2.) As you can see, the basic keyboard part is embellished with three-part female vocals (singing that timeless lyric 'aaaah, aaah, aaah,' etc.), and we have taken the unusual step of including the vocal parts because they are not merely textural. As well as making a pleasant sound, they add, in places, essential melodic and harmonic material. It is sometimes said that a definition of a 'good' composition is one which works well regardless of orchestration, and this piece fits the bill — written on a battered upright piano, it can be variously orchestrated, played soft, loud, or medium, with the melody line played on guitar, sax, flute, or keyboard! Whether that makes it 'good' music I'll leave others to judge, but I still like it a lot; in fact, I like it so much, I'm going to return to it next month in the hope of getting to the end of the score.

Though the music is, I hope, self-explanatory, I should add a few cautionary notes — I'm being serious now, so stop giggling and pay attention. Thank you. Firstly, if you're playing these parts on a synth or workstation, make sure that you've chosen the right octave. This may sound academic and/or nit-picking, but if you play the

Continued on Page 186 ►

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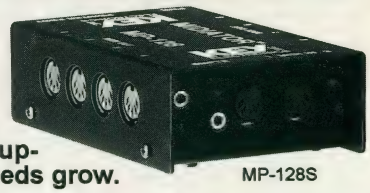

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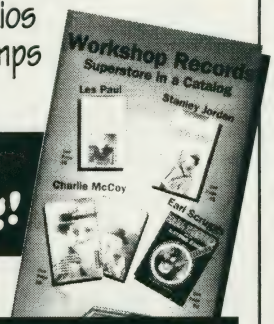

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To enter: Print your name and address on the attached entry card or a facsimile. Enter as often as you wish, but each entry must be postmarked separately. All entries for the *Keyboard*/Bag End 20th Anniversary Giveaway must be received by Jan. 31, 1996. Entrants to the *Keyboard*/Bag End 20th Anniversary Giveaway need not subscribe to *Keyboard*. The winner will be drawn at random and will be notified by mail. The prizes are non-transferable and no substitution is allowed other than made necessary due to availability by the manufacturer. Should this occur, replacement prizes of like or greater value will be provided. The winners may be required to sign and return (within 30 days of notification) an affidavit of compliance with these rules and a release for the use of his or her name for publicity purposes without further consideration. This offer is void where prohibited by law, and is subject to all applicable federal, state, and local regulations. Taxes are the sole responsibility of the winners. The *Keyboard*/Bag End 20th Anniversary Giveaway is not open to employees of participating manufacturers or Miller Freeman, Inc. Odds of winning depend on the number of entries received. The rules and conditions of the *Keyboard*/Bag End 20th Anniversary Giveaway may be changed without prior notice. Miller Freeman, Inc. shall be deemed sole interpreter of the rules and conditions.

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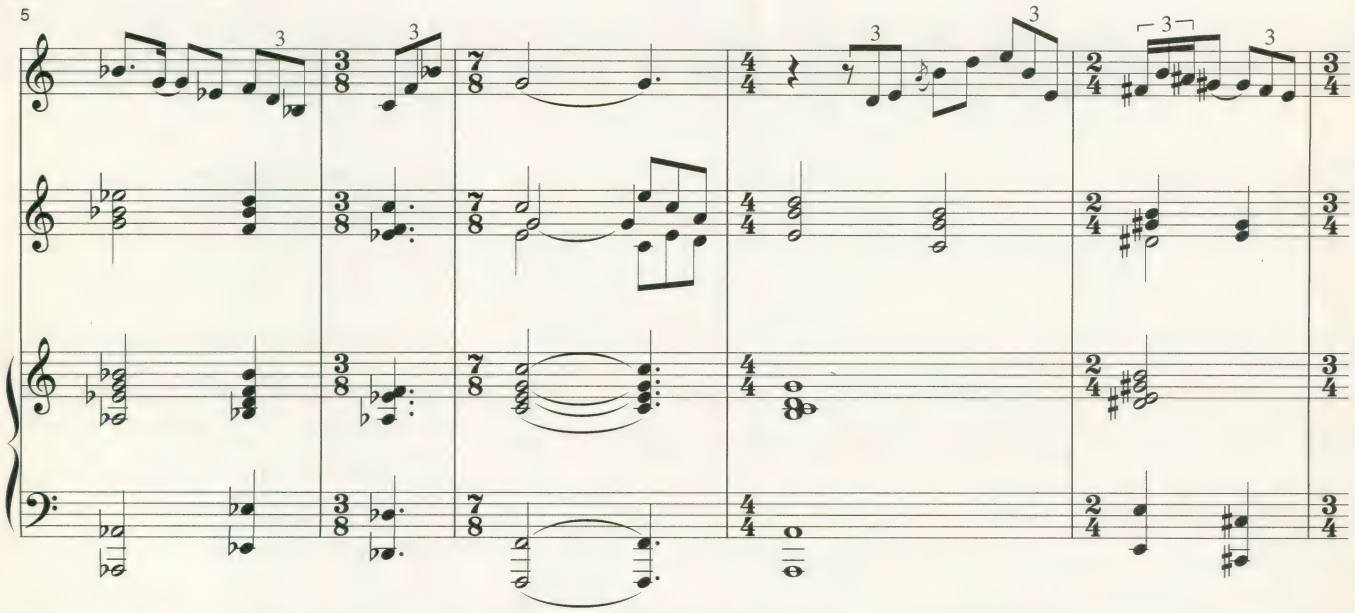
◀ Continued from page 183

opening *C♯m7* chord (and all the others) an octave higher than written, you will immediately lose the warm, mellow quality which is a distinguishing quality of the piece. Secondly, be careful about the tempo — the speed is reasonably slow (♩ = 64), giving the feeling of a very slow, dreamy waltz. Thirdly, play the melody with rhythmic precision; though the tune appears to meander, the difference between its triplets and occasional sixteenth-notes is important, and should be clearly delineated. Fourthly, watch out for the *B♯* note in the melody in bar 3. I was tempted to use a *G♭* major key signature here to avoid this accidental, but I feel okay about it now that I've publicized the issue. (Hans Van Bellinger, clinical psychologist and author of *Stress and the Musician*, writes, "Acute anxiety over accidentals in printed scores is common. The writer is re-living the terrors of the birth experience, and must be humoured.") Lastly, don't get hot and bothered (as classical musicians sometimes seem to do) about the absence of a global key

Ex. 2 (continued from page 182).



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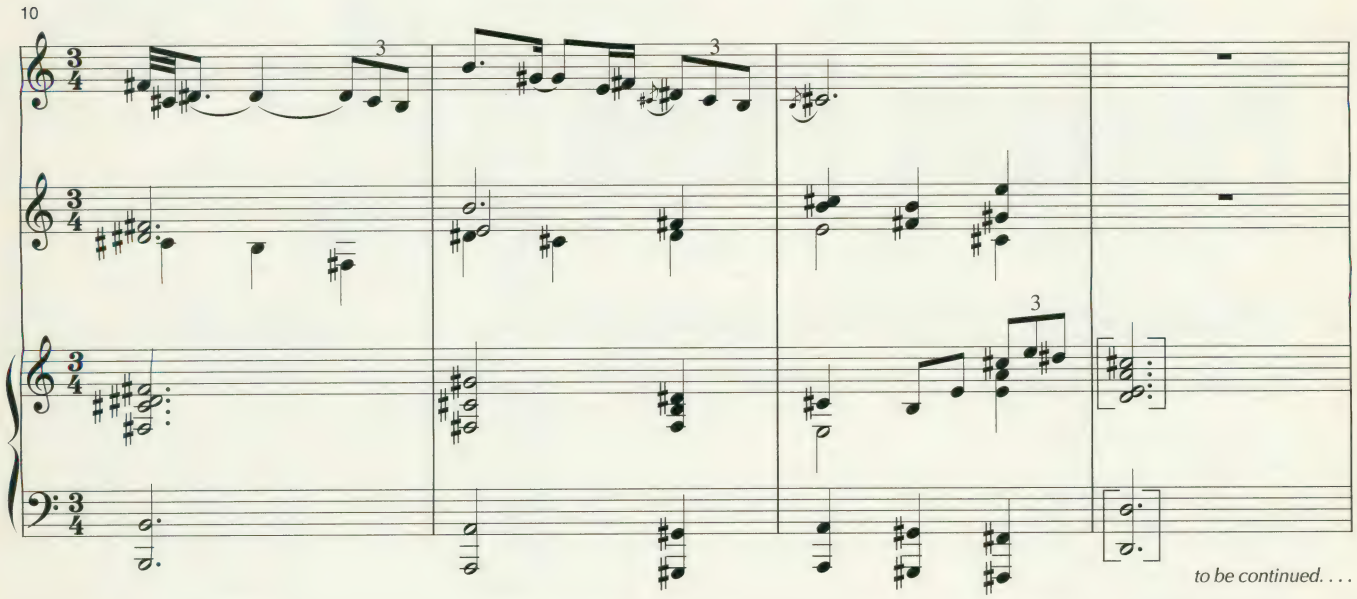
signature — this music changes key practically every bar, and it is simpler just to write in accidentals when they occur. Next month, I'll explain some of the harmonic thought processes which went into the composition, so come to a financial arrangement with your newsagent right now. Thanks to Ken Kubernik of Los Angeles for reminding me of the piece, and for a nice pint in the hallowed region of Harvey Nicks. ■

Dave Stewart & Barbara Gaskin, in keeping with the current trend, have their own Web site on: http://www.demon.co.uk/creative/davebarb/, plus a place where you can send messages on paper: Broken Records, P.O. Box 4416, London SW19 8XR, England. If you're going to send tapes or CDs, please, please try to make the music interesting! The Eric McWhirter track featured above was available on the album Supermarket Moods *by Eric McWhirter And His Small But Competent Studio Orchestra, issued by the Musak company in 1972 but deleted by public request the same year.*



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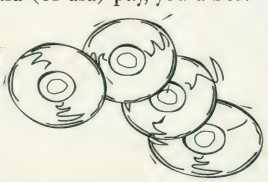

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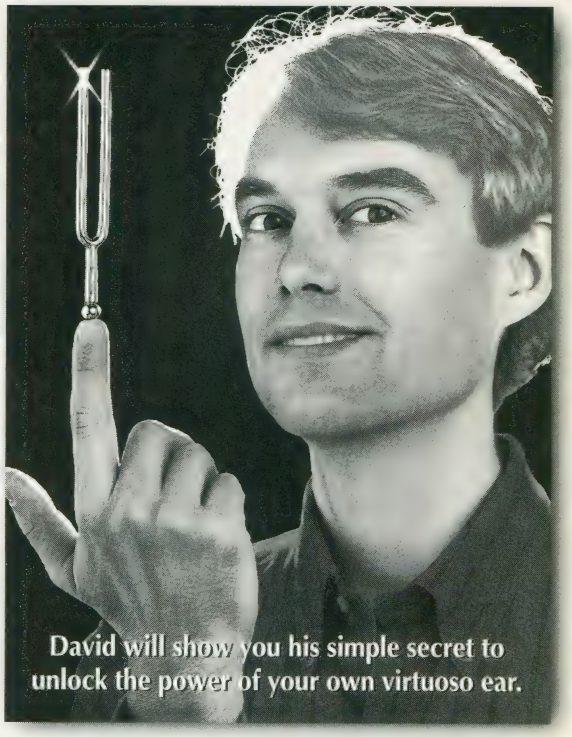

David will show you his simple secret to unlock the power of your own virtuoso ear.

by David L. Burge

IT ALL STARTED in ninth grade as a sort of teenage rivalry.

I would slave at the piano for five hours daily. Linda didn't practice anywhere near that amount. But somehow she always seemed to have an edge which made *her* the star performer of our school.

It was frustrating.

What does she have that I don't? I'd wonder.

Linda's best friend Sheryl sensed my growing competition. One day she bragged on and on about Linda, adding more fuel to my fire.

"You could *never* be as good as *Linda*," she taunted me. "*Linda's* got *Perfect Pitch*."

"What's Perfect Pitch?" I asked.

Sheryl gloated over a few of Linda's uncanny abilities: how she could name any tone or chord —*just by ear*; how she could sing any pitch she wanted—*from mere memory*; how she could play songs after only *listening* to them on the radio!

My heart sank. *Her fantastic EAR is the key to her success* I thought. How could I ever hope to compete with her?

But later I doubted Sheryl's story. How could anyone possibly know F♯ or B♭ just by *listening?* An ear like that would give someone a mastery of the *entire musical language!*

Yet it bothered me. Did Linda *really* have Perfect Pitch? I finally got up the nerve and asked Linda point-blank if the rumors were true.

"Yes," she nodded to me aloofly.

But Perfect Pitch was too good to believe. I rudely pressed, "*Can I test you sometime?*"

"OK," she replied cheerfully.

I couldn't wait to make her eat her words...

My plan was ingeniously simple: I picked a moment when Linda least suspected it, then boldly challenged her to name tones for me—*by ear*.

I made sure she had not been playing any music. I made her stand so she could not see the piano keyboard. I made certain that other classmates could not help her. I set everything up perfectly so I could expose Linda's Perfect Pitch claims as some kind of ridiculous joke.

Nervously I plotted my testing strategy. Linda appeared serene. Then, with silent apprehension, I selected a tone to play. (She'll *never* guess F♯!)

I had barely touched the key.

"F♯," she said.

I was astonished.

I played another tone. She didn't even stop to think. *Instantly* she announced the correct pitch.

Frantically, I played more and more tones here and there on the keyboard. But each time she would somehow know the pitch. She was SO amazing. She could identify tones as easily as *colors!*

"How in the world do you do it?" **I blurted. I was totally boggled.**

"Sing an E♭," I demanded, determined to mess her up.

With barely a pause she sang the proper pitch. I had her sing tone after tone (trying hard to make them increasingly difficult). But as I checked her on the keyboard, I found that she sang each note perfectly on pitch.

I was totally boggled. "*How in the world do you do it?*" I blurted.

"I don't know," she sighed. And to my dismay, that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. My head was dizzy with disbelief. Yet from that moment on I knew *Perfect Pitch is real.*

I couldn't figure it out...

"*How does she DO it?*" I kept asking myself. On the other hand, why can't *everyone* recognize basic musical tones by ear? It dawned on me that most people can't tell a simple C from a C♯, or the key of *A major* from *F major*! It seemed so strange that a *musician* would not know tones—like a painter who doesn't know colors! Or a mathematician who can't recognize numbers! Or an English teacher who cannot identify a dangling participle!

I found myself even more mystified than before. Humiliated and puzzled, I went home to work on this intriguing problem. At age 14, this was a hard nut to crack.

You can be sure I tried it myself. I would sweet-talk my three brothers and two sisters into playing tones for me, then I'd try to guess each pitch by ear. My many attempts were dismal failures.

So I tried playing the tones *over* and *over* in order to memorize them. I tried to feel the "highness" or "lowness" of each pitch. I tried day after day to learn and absorb those elusive tones. But nothing worked. I simply could *not* recognize the pitches by ear.

After weeks in vain, I finally gave up. Linda's Perfect Pitch was extraordinary—a prized trophy of talent and virtuosity. But for me, an ear like that was way out of reach.

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Then it happened...

It was like a miracle. A twist of fate. Like finding the lost Holy Grail.

Once I had stopped *straining* my ear, I started to listen NATURALLY. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. Not *visual* colors, but colors of *pitch,* colors of *sound*. They had always been there. But this was the first time I had ever "let go"—and *listened*—to discover these subtle differences within the musical tones.

Soon—to my own disbelief—*I too could recognize the tones by ear!* It was simple. I could hear how F♯ sounds one way, while B♭ has a *different* sound—sort of like "listening" to red and blue!

The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven and Mozart could mentally envision their masterpieces—and name tones, chords and keys all by ear—*by tuning in to these subtle "pitch colors" within the tones.*

It was almost childish—I felt sure that *anyone* could unlock their own Perfect Pitch by learning this simple secret of "color hearing."

Bursting with excitement, I told my best friend Ann (a flutist) that *she* could have Perfect Pitch too. She *laughed* at me.

"You have to be *born* with Perfect Pitch," she asserted, believing that somehow I always had it.

"You just don't understand how Perfect Pitch works," I countered. "Not long ago I couldn't recognize one note. Now it's *easy!*"

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, it wasn't long before Ann had *also* acquired Perfect Pitch!

We became instant school celebrities. Classmates loved to test our abilities, leaving everyone awed and amazed by the power of our virtuoso ears. Everyone was fascinated with our "supernatural" abilities, but to us it was normal.

Way back then I never would have dreamed that years later I would cause such a stir among college music professors. When I first explained my Perfect Pitch discovery, many of them *laughed* at me. You may have guessed it—they told me, "One must be *born* with Perfect Pitch." Yet once I revealed the simple *secret—and they heard for themselves*—you'd be surprised how fast they changed their tune!

As I continued with my own college studies, my Perfect Pitch ear allowed me to progress far faster than I ever thought possible. I even *skipped over* two required courses. Perfect Pitch made *everything* easier—performing, composing, arranging, sight-reading, transposing, improvising—and it skyrocketed my *enjoyment* of music as well. I learned that music is definitely a HEARING art.

And as for Linda?

Oh yes—I'll have to backtrack a little. Time eventually found me at the end of my senior year of high school. I was now nearly 18. In the four years since I had acquired Perfect Pitch, my piano teacher insisted I had made ten years of progress. But I was still not satisfied I had truly beat out Linda. Now it was my *final chance* to prove myself.

Our local university sponsored a music festival each spring, complete with judges and awards. To my horror, they scheduled me as the last person to play—the *grand finale* of the entire event.

Linda gave her usual sterling performance. It would be tough to match, let alone surpass. I went for it. Slinking to the stage, I sat down and played my heart out.

Guess what? I scored an A+ in the most advanced performance category.

Linda only got an A.

Sweet victory was music to my ears—mine at last!

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These days, thousands of musicians around the world and research at two universities have also proved my Perfect Pitch method (info on request).

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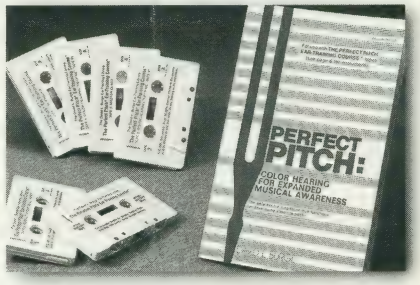

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◀ Continued from page 199

arpeggiate in their league, even though I can keep up in my mind. Some of the dirt is psychological. Life is an emotional minefield, and lots of potential artists have been shut down along the way by traumatic experiences (not necessarily big shocks, either; small, cumulative injuries can do huge damage over time). More than anything else, though, the dirt on the lens is false knowledge.

Say, for example, that you've heard of driving a car, but you've never seen one. Suddenly the heavens open up and a '57 candyflake red T-bird convertible is deposited before you, glistening in a shaft of celestial light. A blonde archangel in an Armani choir robe hands you the keys and says, "Hey, take it for a spin," then vanishes. Excited, you get inside. Only now the trouble starts. Maybe you figure out where the key goes. Maybe you even figure out how to start the thing, and put it in gear. But you keep stepping on the brake when you mean to step on the gas, and the gear you keep finding is reverse, not drive, and accidentally stalling is a definite problem, and pretty soon you're feeling frustrated and the T-bird is sporting a fresh coat of dents. Meanwhile the archangel reappears, sailing past you at 75 mph in a Maserati as black as sin and polished as John F. Kennedy, Jr. It's obvious this driving business has got to be divine providence. Right?

Wrong. Same thing for drawing, painting, singing, dancing, playing an instrument, casting a bronze, or composing a symphony. If you've got a certain low minimum standard of physiological equipment, *you can learn to do these things.* You can even learn to do them well! But first you have to stop believing in "talent." You have to stop thinking you already know what these things are, and what they must feel like in the doing.

Because if you can't do them yet, it's because you don't know how they actually feel. You don't know what they really are. That simple. You just know what you *think* they are — and you're wrong.

Small wonder, then, that when you try them you don't get anywhere.

At this point, in person, I usually hear a flood of rebuttal from those who consider themselves aggressively untalented in some field. This is my cue to haul out Betty Edwards' book. Two things make it particularly useful. First, this art stuff is a litmus test. Folks really do see it as dependent on "talent," even more than writing and making music, so those who think that they can't draw are absolutely sure of their position: some can, they can't, that's that. Second, Edwards has the perfect counter in the form of dozens of dated before-and-after drawings by her students.

I love to put my finger over the dates and then show these paired illustrations to protesting non-artists. On the left they see a prime example of bad self-portraiture, the kind of scrawl only a very young child might love. On the right they see a sophisticated self-portrait, a drawing that shows a strong grasp of light, shadow, line, form, and spatial relationships. Put more bluntly: talent zip on the left, while on the right, talent galore.

Then I lift my finger, and their jaws drop — because in example after example the difference between utter crap and unquestionable drawing ability is a matter not of decades, or years, but of only a few months. In a very real sense, these students didn't learn how to draw at all. Instead, through the exercises in Edwards' program, they *un*learned their false beliefs about drawing. They cleared that bit of dirt off the lens, and discovered a part of themselves that had always been there, but that they had never known.

Edwards' main point can be summed up in a single example. When a person who "can't draw" is handed pencil, paper, and a teacup for a model, they don't trust their natural eye-hand coordination and right-brain spatial-processing intelligence. Instead they override these links and try to think their way through the task, using the more left-brain tools of logic and language. In this part of their head they know that the top of a teacup is round, so straight-away they draw a circle (ignoring the foreshortened ellipse they actually *see*). They also know that a teacup's handle is round, so they draw another circle for it, disconnected from the first. And the sides are rounded curves, so . . . now wait a minute, how come this doesn't look right? The answer is that the cup in their head is broken. In fact it isn't really a cup at all, or a picture of one, but a conceptual list of facts *about* a cup. Attempting to draw by laboriously rendering the individual elements of that list, each in isolation from the others, is like trying to talk by spelling out the letters in every word. I.t.m.a.y.c.o.m.m.u.n.i.c.a.t.e.s.o.m.e.t.h.i.n.g.b.u.t.n.o.t.v.e.r.y.w.e.l.l.

What Edwards does is short-circuit this mistaken process. Her exercises take the left brain out of the loop and let the right brain, eye, and hand get on with something they are just naturally good at, given the chance: drawing. From that foundation, bit by bit, she illuminates the real rules of the visual arts, which are fewer and simpler than anyone outside the activity might dream. Result? Frogs into princes, dross into gold, damaged non-artists into happier, healthier human beings who have learned a surprising thing . . . they actually can draw after all.

So. If drawing — generally considered the most mysterious "talent" of them all — is as natural and fundamental a human capacity as walking or talking, and considerably easier than making sense of an NFL betting pool, then what does that say about all the other creative pleasures we may be denying ourselves?

Hmmm. We'll never know until we try. ■

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letters

◀*Continued from page 171*

were real horns backing him up. And how about "Jive Talking" by the Bee Gees?

Steve Hofer
Indianapolis, IN

Happy Accident(al)s

I was surprised to see the spelling errors in Fred Hersch's Solo Piano column in the September issue. In Example 1, bar 2, where the chord is shown as *D7aug*, the note between an *A* and a *B* should be *A*♯, not *B*♭. Likewise, in bar 6 of the same example the *E*♭ melody note above a *G7aug* chord should have been notated as a *D*♯. Yes, on a piano *B*♭ and *A*♯ sound exactly the same. But that doesn't mean there isn't a difference. As professional writers, would you confuse "right" with "write"?

Ethan Winer
New Milford, CT

[*Ethan — You're right about the enharmonic spelling, but the* real *mistake was publishing a melody that's in the key of* B♭ *with no key signature. Both the* B♭ *and* E♭ *melody notes are spelled properly with reference to the key of the song, which leaves theorists with an uncomfortable dilemma: Do you grotesquely distort the spelling of the melody in order to accommodate the correct chord spelling, do you substitute a chord symbol (in this case,* D7♭13*) that refers to the correct melody note but makes reading the chord chart harder and perhaps misrepresents the function of the chord in the progression, or do you bite the bullet (as many jazz players do) and simply accept an imperfect notation system that gets the player's fingers onto the correct keys? In a crunch, we opt for the latter.*]

Sex, Schmex

I can't believe how so many people are spending too much time and space to discuss some ads that used women to sell music products! I personally didn't like the ads, but I think the manufacturers have to be free to use whatever they want to call attention to their products. And surely they got the attention. Okay, folks, let's talk about music.

Miguel Ratton
Rio de Janeiro, Brasil

Did you know Sydney Urshan Music and Symetrix were mentioned by your readers 22 times in four months? Hats off to the ad agencies for truly successful campaigns!

Andrew Furgal
Chicago, IL

[*Andrew — That's 23.*]

Something Old, Something New

Years before Mr. Halpern published his music, we enjoyed the music of Deuter, a German composer who resides in the USA. His music has been used for 25 years for relaxation and healing by professionals all over the world.

Monika Luders
Kula, HI

Giving Steven Halpern [Sept. '95] credit for being the "father of new age" is erroneous. He seems to think he created this musical genre, but throughout music history, musical styles have evolved out of preceding styles. It's easy to understand how new age music trickled down from classical, jazz, folk, and ethnic music. While Halpern *does* deserve credit for campaigning for the acceptance of new age music, let's not forget the musicians who were out there before 1969, musicians like Tony Scott, Paul Horn, Paul Winter, Will Ackerman, and Tangerine Dream (to name a few).

Lois D. Snow
Paducah, KY

Harum Scarum

Come on, guys, how about an article on the *first* progressive rock band, Procol Harum — the only such band deserving of the label "symphonic." Avoid my suggestion and risk eternal disgrace!

George Bertok
Peterborough, Ontario
Canada

The Cup In Your Head Is Broken

CONNOR FREFF COCHRAN

The audience sitting inside the private screening room was not what you would call homogenous. In fact, it was polarized pretty neatly, if along unconventional lines: one-half miscellaneous science fiction fans, mostly overweight and relatively ragged, and one-half doctors and lawyers and their wives and close relatives, also overweight but so far from ragged that they looked waxed and buffed. The year was 1975. The location was Chevy Chase, an upscale Maryland suburb of Washington D.C. What had brought these two vastly different collections of people together was the movie version of Harlan Ellison's *A Boy and His Dog*. The science fiction fans were there by way of apology: The film's originally-planned premiere at the World SF Convention, just a few months before, had been shut down by technical disasters. The professional crowd was there by way of influence: They were either investors or close friends of investors, and the producer wanted them happy.

The room darkened. The projector rolled. The story — a grim, satirical slice of life in post-nuclear war America, starring a very young Don Johnson — unfolded. Then the lights came on again, and the producer stood up and asked if anyone had questions or comments.

To understand what happened next you need to know only this much about the story: It's kind of your classic Boy and Telepathic Talking Dog Meet Girl, Boy Loses Dog, Boy Wins Girl, Dog Gets Shot and is Starving, Boy Regretfully Kills Girl and Feeds Her to Dog to Save Him storyline. The ending of Harlan's savage original went this way: "She'd asked him if he knew what love was. Sure. A boy loves his dog." The movie opted for a *really* wry pun by the dog instead, which is either gross or funny depending on how you respond to black humor, and backed it with a tasteful lack of explicit visuals. You don't see the killing or the cooking or the eating.

Okay. You've got the gist. So the producer got up and asked for responses, and right away a little silver-haired lady in her late 60s, part of the monied contingent, put her hand up and tremulously said, "I didn't like the ending."

All the SF fans shook their heads condescendingly. Of course she didn't like the ending. Big surprise, they thought; she's exactly the kind of smug, conservative, unthinking Status Quo American the last third of the movie satirizes!

But the producer was being real polite. After all, these people paid his salary. "And what didn't you like about the ending, ma'am?"

The woman paused, looking very serious. Then she spoke, just as sweetly and honestly as possible, and with a voice and manner straight from the Perfect Grandmother training video. Only what she said was . . .

"Well, I felt cheated. If I'm going to go to a movie with cannibalism at the end, I'd like to at least see an arm or a leg on a spit or something."

. . . and the eyelids of every SF fan in the room snapped wide open in shock. You could hear the lashes bounce.

Never can tell, can you? The world is surprising. There are carnivorous grannies wearing cultured pearls, and saints in fifth-hand flannel. Which is why it isn't necessarily safe nor sane to be too certain.

More often than not a *pre*conception is just a *mis*conception that hasn't been exploded yet.

For a wonderful example of this truth as it relates to the creative arts, the curious need look no further than a book by Betty Edwards called *Drawing on the Right Side of the Brain*. Its subtitle is "A Course in Enhancing Creativity and Artistic Confidence," and for years I have recommended it with unrestricted enthusiasm to every creator (or creator-wannabe) I have met, especially those whose talents do not apparently reside in the visual arts. This book puts dynamite under one of the world's most cherished assumptions regarding creative people, and gleefully lights the fuse.

The assumption I'm talking about is talent. You know — that God-given, either-you-have-it-or-you-don't stuff. That exquisite essence of sensibility which the lucky among us were born with and everyone else can go suck sewer pipes. That incredible, mind-boggling, unmitigated . . . lie.

There is no such thing as talent. Or lack of talent. What there is, actually, is just one big light that is willing to shine through every person on the planet, in any way said person may want, if only there wasn't so much dirt on their personal lens. Some of the dirt is impatience. It takes time to train the hands and arms to the level of unconscious coordination necessary to play Mozart, and not everyone is willing to cut their neuromuscular system that much slack. Some of the dirt is physiological limitation. Rick Wakeman and Eddie Van Halen have a higher percentage of fast-twitch muscle fibers than I do, so I'll never hammer-on or

Continued on page 190 ►

Connor Freff Cochran is happily busy with a new partnership and new projects, including forays into that strange place called Hollywood. If you are interested in more of his explorations into creativity and life, just write c/o Crossing Point, 47 Lafayette Circle, Suite 180, Lafayette, CA 94549, and ask for a free copy of Connor's Creation *newsletter.*

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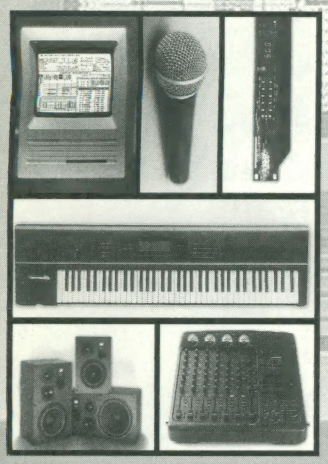

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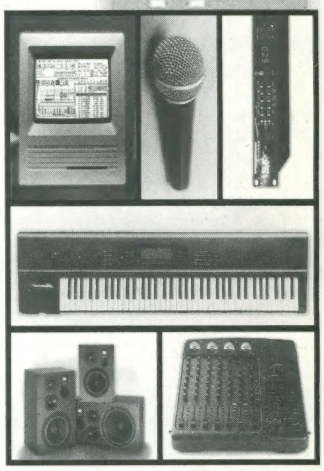

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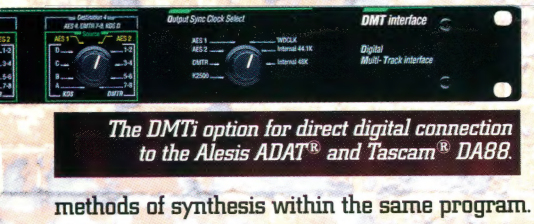

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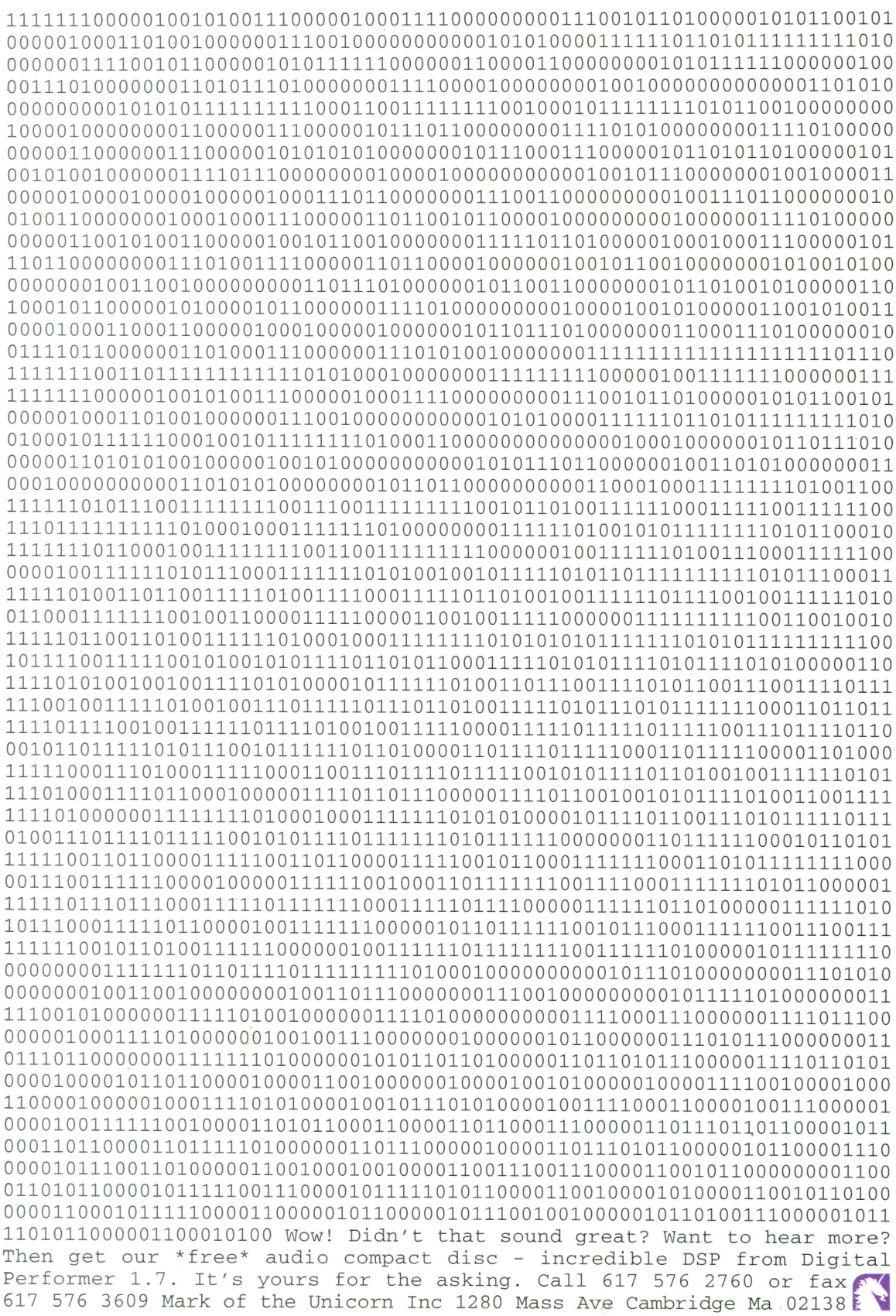

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